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What Causes Eyestrain in Children?*

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A CLEAR and simple explanation of the common causes of eyestrain in children, indicating the importance of periodic examinations and careful treatment

What Are Normal Eyes?

In any consideration of vision, it is important to remember that, besides being an optical instrument, the human eye is a living organ composed of blood vessels, nerves, muscles and other tissues. All of these parts are subject to the general laws of health. The eye is not an independent organ but rather it is so closely integrated with the body as a whole that it reflects general disease in its own tissues and its function may be impaired. On the other hand, when the eyes are originally at fault, they may set up reflex symptoms that give rise to headaches, dizziness, nausea, indigestion and other general body disturbances. A previous knowledge of general medicine is so important in the treatment of the eye that the American Medical Association requires that every ophthalmologist be a qualified doctor of medicine (M.D.).

One of the commonest misunderstandings about eyes is the general impression that good vision indicates healthy eyes. The child in school is asked to read a chart and if he reads the 20/20 line, which is the accepted standard for normal vision, he is passed as having practically perfect eyes. If he fails to read the 20/20 line, he is usually told that his eyes are not normal and that he needs glasses. Neither statement is necessarily true, however, for the simple reason that no distinction is made in these simple tests between what the eyes can see and how they see it. In other words, if a child has to strain his eyes in order to read the chart,

* Radio address delivered over Station WOR, February 9, 1937.

his eyes are not normal, even though he reads the so-called normal line.

A child with normal eyes should see clearly in the distance and nearby without any undue effort and without being conscious in any way of his eyes. Eye consciousness means eyestrain of some sort and should be investigated immediately.

Eyestrain may be defined as any extra exertion that is required of the eyes in order to get the best vision of which those eyes are capable. Strain always exists when the eyes are not optically correct because the eyes work automatically and invariably make every effort to see as well as they can.

The three optical faults which induce eyestrain are farsightedness, nearsightedness and astigmatism. Although these can exist in combination, it would be better to consider them separately.

How Farsightedness Causes Fatigue

Farsightedness, or hyperopia, does not mean good vision in the distance. Actually, it means that the eyes have to strain even when they look in the distance, and the more farsighted a child is, the more his eyes must strain. Normal eyes are completely relaxed and rested when they look in the distance because the image of what they are looking at falls directly on the retina (which corresponds to the film in a camera) without any effort of focusing. Normal eyes must focus only when they look at nearby objects, and the muscle which does the focusing is designed to do this near work without any fatigue. In farsighted eyes, however, the image falls too far back even when the eyes are looking in the distance and the retina does not receive a clear-cut picture until the focusing muscle starts working and brings the image up to the retina.

That means that the focusing muscle never gets a rest and for close objects it must work more than in normal eyes.

Little Johnnie, aged 9, was just such a case. At home he was disobedient, irritable and nervous. In school he was called lazy, indifferent and backward. No one suspected that his eyes might be the cause of his trouble because he could always read the smallest line on the test chart, and he was taken from one doctor to another for general examination until finally one suggested a thorough eye examination. Now a "thorough" eye examination

means a complete check of the physical health of the eyes and a determination of the total optical error if any exists. In children, especially, the focusing muscle is so active that it will not permit an exact optical measurement unless it is quieted. Medicine is therefore used to relax the muscle completely and the eyes are measured objectively without the possibility of erroneous answers from the child. Unless this is done, it is not possible to know the total optical error. In Johnnie's case, a large amount of farsightedness was found, and when this was corrected with glasses, his improvement was remarkable. Before he got his glasses, he was straining so much for his ordinary distant vision that when he was asked to apply himself to his books his focusing muscle was too fatigued and he found it much easier to relax by gazing off into space. He was always tired because his focusing muscle was always being overworked. He wasn't really lazy or indifferent, but a fellow can't be expected to be full of pep when some of his muscles are always tired out.

The glasses did the work that the focusing muscles had been forced to do and that left Johnnie with lots of reserve energy. He began to apply himself to his lessons, which were now easy to read, and his whole disposition changed. With his glasses he had become a normal boy.

Why Nearsighted Eyes Become Tired

Myopia, or nearsightedness, is another story. In addition to having defective distant vision, nearsighted eyes are inherently weaker and their supporting structures allow a certain amount of stretching. The more the eyeballs stretch, the more nearsighted they become, so every effort must be made to keep them healthy and strong.

Optically, the eyes are so constructed that distant vision is not clear because the image falls in front of the retina. The focusing muscle cannot help for distant vision because it works only when the image is behind the retina and never when it is in front. With less than normal focusing to do, the eye naturally becomes lazy, and a lazy eye is not a healthy one.

Nearsighted children can see close work very well, and since their distant vision is poor, they naturally prefer to stay in the house

and play with toys or books. The tendency is to hold objects so close that the eyes have to point in or converge excessively and the resultant strain tends to congest and further weaken the eye structures and thus make the nearsightedness worse.

Nearsightedness tends to increase with age but the amount of increase can be controlled to a great extent by proper optical and hygienic care. The most critical period is in the early school life, from the ages of seven to fourteen, and if the nearsightedness is carefully treated during those years, it can usually be held to a minimum. Periodic examinations are necessary to determine the progress of the myopia and to keep the glasses up to the full strength.

Glasses are prescribed for two reasons: a full correction will give the child normal vision for distance, and the focusing muscle will be forced to act in a normal manner. Any correction that is less than full strength fails in both respects. On the other hand, if the glasses are too strong, they force the focusing muscle to overact just as it does in farsightedness, with the inevitable strain. The exact strength of the glass is much more important in nearsightedness than in farsightedness, so it is essential that the child's focusing muscle be relaxed with drops before an intelligent prescription can be given. With this method of procedure, the amount of increase, if any, can be determined exactly at subsequent examinations. Any other method is only a guess.

The glasses should be worn constantly and all close work should be done under the best illumination. If the myopia progresses too rapidly, close work will have to be curtailed. Correct posture is very important to avoid congestion of the blood vessels of the head, neck and eyes. The nearsighted child should learn to sit straight and to stand straight and should never read in awkward positions or with the print too close. That means no funny papers on the library floor.

The tendency to weakened eye structures is best combatted by a robust physique. Sunshine, fresh air, rest and nourishment play just as important a part in the treatment of nearsightedness as do glasses. None of these alone can do the job fully; in combination they give the nearsighted child his best chance for healthy, useful eyes.

What is Astigmatism?

Astigmatism is a word to conjure with. Patients never forget it and they like to blame it for all their troubles. And yet there are very few eyes that have not some astigmatism. The word means "not a point," signifying that images on the retina are not as sharp in outline as a point should be. It is entirely an optical defect of the eyes and in small amounts has no significance. In large amounts, however, the child is conscious of defective eyes and his vision is distorted. Somewhere in between the small normal amount and the obvious large amount is the intermediate astigmatism that is responsible for eyestrain and that is so often unrecognized.

Only when the surfaces of the eye are perfectly spherical is there no astigmatism. Nature seldom makes things so perfect. The eyeball is usually curved a little more in one meridian than it is in another; or the lens of the eye may have unequal curvatures.

The result is that the vertical part of a cross is not in focus at the same time that the horizontal part is, or one diagonal part of the object will seem fuzzy when the opposite diagonal is sharp. The only way for the eye to get any blurred image in focus is to call upon the focusing muscle, and once more we find the child struggling with overactivity of this muscle.

Astigmatism is responsible for many reflex nervous disturbances. About 60 per cent of the headaches that come after close work can be attributed to this source, and in severe, uncorrected cases the child may suffer from dizziness, nausea, vomiting or other systemic reactions. The focusing muscle tries to work in two different directions at the same time to correct the trouble and, although it cannot possibly succeed, it continues to try. Since the vision is not always impaired, the eyes may not be suspected, but once the trouble has been discovered and corrected, the relief is immediate. Glasses are prescribed which bend the rays of light so that all parts of the object are focussed accurately on the retina. Naturally the glasses have to be worn all the time or the symptoms will return.

Not long ago a young boy was given glasses for a rather large amount of astigmatism in each eye. After wearing them for a week he returned to say that they had completely cured him of his

symptoms. He had been suffering from indigestion and regularly had one or two mild convulsions a week. His case was rather dramatic, to be sure, but many other nervous reactions have been found to be due to uncorrected astigmatism, and their cure has been just as effective.

Cross Eyes

Another cause of eyestrain is an imbalance between the two eyes, which often makes the eyes cross. Besides working properly alone, each eye must work well with its fellow, or trouble will result. When an eye becomes crossed or turns out, the vision is often suppressed. But long before any trouble is obvious, there may be a terrific strain which tends to turn the eyes in or out. If discovered early, this tendency can often be corrected with glasses. Fortunately it is always checked carefully by the eye physician. Time does not permit any further discussion of this interesting subject.

Summary

Eyestrain, then, can be relieved. In farsightedness all the symptoms are due to the extra burden that is thrown upon the focusing muscle and when the muscle is relieved by the use of glasses, the symptoms disappear. The farsighted child may see perfectly without glasses, but a competent examination will easily disclose the fact that he is overworking his eyes and that eye fatigue is being reflected in the whole body. The glasses may have to be worn all the time or they may be necessary only occasionally, depending upon the amount of strain present.

Nearsightedness is the result of a weakened and elongated eyeball. Glasses are necessary to improve the vision and to prevent the eyes from being too lazy. The health of the eyeball is of special importance and this is aided by controlling the eye work and building up the general health. Glasses should be worn constantly.

Astigmatism is the result of unequal curvatures of the eye, resulting in a distorted image which the focusing muscle tries in vain to correct. In appreciable amounts the child suffers from

reflex nervous disturbances. Glasses will correct the astigmatism and should be worn constantly.

In every one of these three different types of optical error, a knowledge of the total amount of the error is essential, and this can be obtained only by the use of relaxing drops. Exercise will not take the place of glasses nor are there any other shortcuts to the proper correction of the trouble.

There is no definite period which should be set aside for the first eye examination of any child. The eyes should certainly be examined before a child enters school, and long before that if there is any question about his vision or health. Subsequent examinations will be requested by the eye physician as a result of his findings. A complete examination of the eyes includes a consideration of general health and inspection of external and internal parts of the eye. Parents should never object to the use of drops during examination because they enable the physician to measure the eye exactly, and perhaps to discover an error that was being masked by a fatigued and restless focusing muscle.

The various health tests in schools are doing the young child a world of good in the detection of manifest faults. The vision tests are invaluable, but they should always be supplemented by a complete examination by the eye physician. With a better understanding on the part of the parents, the child will not have to suffer from eyestrain.

Visual Problems in Education*

Lucy V. Ailer, R.N.

PRACTICAL advice based on experience gained as a health supervisor and a county public health nurse

THIS paper is based largely upon experience gained in more than five years' work as health supervisor in a small city school system of about 1,700 pupils, and two years' work as a county public health nurse where, in a general program, some eye work was attempted among the pupils of the county schools.

Lighting Problems

The problems in both localities have been much the same. I should like first to consider the problems which arise from the school buildings and equipment where, all too often, little can be done to remedy conditions. Old buildings must be used as they are, poor conditions being corrected by diverse makeshifts and devices. Many rooms still have cross lighting. Where rooms are arranged so that light comes only from one side, we find too little light on the opposite side of the room unless the upper halves of the window shades are lowered. If the shades are raised to the top of the window, children near the window often are in the bright sunlight, while those across the room have just enough light to do their work. If the shades are lowered, the artificial lights must be turned on, and frequently all are on when the switch is turned.

This problem may be partially solved by use of adjustable window shades or separate shades for each window sash. Buff-colored shades seem best suited and are widely used in school buildings. Electric lighting should be installed on different circuits in a room so that only the section needing more light may have it. It may be

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possible to borrow or purchase a light meter to determine what changes should be made in the amount and distribution of light in a given room.

Correct Equipment and Proper Arrangement

Streaks of sunshine, glare and shadows should be controlled as much as possible. Work materials should not have shiny surfaces which give off glare, and type should be large enough to be read with ease. Wall maps and charts also should have a dull finish to avoid glare and should be so placed that they may be seen without eye fatigue.

The seating should be arranged so that the light comes from the left, since most pupils are right-handed; seats and desks should be of such height that a child may be seated properly at his desk. Where the old formal type of seats and desks are used, some improvement may be made by having different sizes. Where space permits, sometimes a diagonal arrangement works to greater advantage than the old formal plan, and, of course, children should not sit facing the light.

In the lower grades, we find pencils with a heavy lead work out better with the little children. Heavy, cream-colored chalk is recommended.

To avoid glare, blackboards should have a dull surface, and writing on the board should be large enough for pupils sitting at the greatest distance from it to see with ease. The use of small pictures held before a class is not deemed good practice, as angles and distance cause too much strain for some of the pupils. The same would hold true of flash cards unless used before small groups seated near the teacher. All equipment should be such that accident hazards are at a minimum.

The school nurse, in her visits to the rooms, may help the teachers by suggesting changes which will benefit a child or a group. She and the teacher have a great opportunity to make a much more pleasant and happy life for many a pupil.

Not infrequently we meet children who are behavior problems in the school as well as at home, and upon inspection they are found to have impaired vision. Often, proper refraction makes quite a different child of the former problem case.

Nearsightedness and Farsightedness

Nearsighted children frequently do not see clearly enough to enjoy playing with others, but do get pleasure from reading. While they do not see the print well, they can bring a book close enough to their eyes to give them reading satisfaction. Because of this condition, they become unsocial. In school, while other pupils are studying charts or are working on the blackboard, these children are unable to see the normal distance and so lose interest. As a consequence, they frequently are the mischief makers. They annoy the other children and the teacher.

The same is true of farsighted children. They get into trouble when close work is to be done because objects which are close are blurred to them. An account of two different children will illustrate:

A child had 20/100 and 20/200 vision, with glasses. He came from a family in which eye defects were inherited from generation to generation. Two of his maternal grandparents were blind—had been for years—his mother has very little vision and one brother was in the State School for the Blind. Another brother had impaired vision but was able with correction to continue in the regular classes. Several cousins were affected similarly.

His mother would not consent to send the boy to the state school and he had too little vision, even with glasses, to attend the sight-saving classes at Mansfield. The oculist recommended the State School for the Blind, and still his mother would not send him. Because of certain circumstances, the boy was permitted to remain in the regular classes until he was about eleven. During these years he became a bad behavior problem and had to be sent about the building on errands to keep him occupied. He fought with the other children, annoyed them in class and tormented his teacher. Finally, through the added efforts of a nurse from the State Commission for the Blind and of the Juvenile Judge, the child was sent to the school for the blind. However, his habits had been formed and, thus far, he has continued to be a problem at the state school.

Another case of low vision with different results was that of a little boy entering the first grade. Upon inspection, it was found that he had only 20/100 vision. His parents were told of the defect and immediately he was taken to the oculist, and, with glasses, he is able to attend a sight-saving class where his parents were happy to send him. The parents in this case were unaware of the child's

defect and appreciated the help received through the school health service. This child is making splendid progress and forming good study habits.

Many of the children who have had vision corrections make a marked advance in their school work. They wear their glasses willingly and take good care of them. When going out on the playground, they often leave their glasses on the teacher's desk. Of course, where marked defects exist, the glasses must be worn, but care is taken not to play games where they may be broken.

Sight-Saving Classes

There are 33 sight-saving classes in Ohio, which "in general, enroll children whose vision is between 20/200 and 20/70, together with children suffering from progressive eye troubles." Sight-saving classes are valuable through giving educational advantages to children with seriously defective vision while saving their sight. Normally sighted children are benefited, since the teacher is relieved of the necessity for devoting a disproportionate amount of time to the handicapped children. The educational system is helped by being relieved of those repeaters who have failed to make their grade because of defective vision. The state benefits from this by investing in children who will thus become an asset rather than a liability to the community. Children whose vision is so low that they must be taught Braille are sent to the State School for the Blind.

There are many schools which have no health service and many others which have the services of a nurse but not of a physician. In Ohio, by law, boards of education may employ a school nurse only when they employ a school physician. Boards with limited funds thus find it difficult to have a health service other than that provided in physical education. If the board of education employs a nurse only, she must be in some capacity other than that of school nurse. Such a nurse working alone in a school system must have the close co-operation of the physicians of the community and of the health commissioner.

It is in this category that I find myself. I have, in addition to the health supervision which entails the routine inspections, the responsibility of the course of study in health, and visiting teacher

and attendance work. Within my five years in Galion, 50 indigent children have had corrections by glasses, three have been assigned to the Ohio State School for the Blind, and one child attends the sight-saving class at Mansfield.

There are two physicians on the board of education, and on their recommendation the board has made a ruling that all indigent cases must be cared for by an oculist, and they have designated the doctor to whom the children are to be taken.

We are very fortunate in being near one of the physician members of the State Commission for the Blind who does all of our work with indigents, making the examinations gratis and charging only the wholesale price for the glasses. He has been the source of inspiration and encouragement in the eye work done.

The Red Cross furnishes the money for physical corrections, which is divided among tonsil, dental and eye cases. The budget allowed is about $600 per year—not a large amount when all defects are considered. The Public Health League, Kiwanis and Rotary Clubs also participate in caring for indigents.

One of the biggest problems is to decide just which children should receive these corrections. Some of the children with the greatest amount of defect, we know, complain the least, while others with only minor defects present more symptoms. Then there are the exceptional children. This group includes the children of inferior and superior mentality; the problem arises as to the correction of the inferior group when the funds are so limited.

All children should have the privilege of being made as nearly normal as possible, and when the inferior group has other handicaps to battle, it seems that they should have vision defects corrected, if possible. However, the members of the group in the upper bracket have possibilities of going far in the world and not only caring for themselves, but also contributing to the well-being of others.

I should like to cite the case of one of our high school graduates of last year. He had his elementary schooling in the sight-saving class at Mansfield, entering the regular classes in junior high school. In his last year this boy entered a state-wide essay contest sponsored by the American Legion and received the honor award, which was a trip to Washington. Had he been deprived of early correc-

tion and special education, he possibly would not have achieved this honor.

Frequently requests for correction come for the mentally inferior group, particularly where families have been cared for by various agencies. If, because of limited finances, the correction is not made, there is sometimes much talk and the idea gains ground that one is discriminating against the family. These cases are difficult, for one cannot say to a family that the child is inferior mentally.

Sometimes, in advising corrections, just the opposite is true. It may be imperative that a child have correction and yet the family will object. Many excuses are offered, from not wanting to accept help to religious beliefs. Occasionally families think it is unnecessary because the child can read, gets along well in school and no one in the family has ever worn glasses.

This discussion has been largely in reference to indigent cases, but families who can well afford to have corrections made often resist. In their cases, similar excuses may be offered. Sometimes the automobile needs immediate repairs and there is not money for both; or the child does not want to wear glasses.

Routine Eye Inspection

As to the inspection itself: each child has the routine school inspection once each year, and for this work there is no ideal place at any of the buildings. In some instances the inspections must be made in the schoolroom where the class is working. All that I can say for this is that it is better than no inspection. However, under such poor conditions, it is remarkable how well the children cooperate when the routine is explained to them and they are asked to continue with their regular work until called upon. The teachers, in these cases, keep the children occupied, and, fortunately, the child being inspected generally is not distracted by the others.

In a more modern building, a music room is used where children are taken separately, and a more satisfactory piece of work is done.

In the visual acuity test, the floor is measured for the twenty-foot distance and chalked. Shorter distances are also chalked for cases of marked defect. The child is seated and the chart is placed

so that the 20/20 line is on a level with the eye. The right eye is tested first, then the left, and the eye not in use is covered with the child's cupped hand.

Charts drawn to the Snellen scale are used—the Symbol E chart for the small children and the letter chart for the older children. Without going into the technique of vision testing further, I wish to state that after the inspections are completed, a record of the group is given to the teacher and the health record of each child is kept by the nurse.

The children having vision defects are seated to their best advantage in order to relieve as much eyestrain as possible. Notes are sent to all parents of children showing defects, and home visits are made in cases where defects are marked and corrections should be made as soon as possible. The parents are urged to consult an oculist. In the case of indigent children for whom the nurse plans the corrections and whom she accompanies to the oculist, the exact condition is understood. This, in turn, is explained to the teacher. I have always found the teachers interested and anxious to help such children in every way possible.

Preschool Examinations

Every spring, after taking the school census, a preschool conference is held at each building where we have a beginning group. All parents are asked to bring their children who will enter school or kindergarten the next autumn. We have two kindergartens; thus many children who are only five are examined each year.

The physicians of the community donate their time for this work. Each child is given a thorough examination and, with the parents' consent, is vaccinated against smallpox and immunized against diphtheria. The visual acuity test is done by the nurse and the parent is immediately told of the results. In this way we strive to have all corrections made before the child enters school. Consideration in indigent cases is given on the same basis as to the children already in school, insofar as it is possible. Of course, we have no way of judging the mental ability of the children except from casual observation, which is indeed a very poor means, in fact, most unsatisfactory.

Common Eye Diseases and Defects

Other than vision defects, eye conditions most commonly seen among our school children are sties, blepharitis, conjunctivitis, and strabismus. Parents do not realize the consequences which may follow any of these conditions. Fortunately, there are very few cases of strabismus and they have generally benefited from glasses. Of three children who should have been operated upon, only one has been thus cared for.

Home treatments for the other conditions are common, and the advice of neighbors or "granny women" is all too often followed, rather than visiting the physician and following his treatment.

Children having conjunctivitis are sent home with a note or taken home and the parent contacted. Sometimes it is necessary to require a note from the physician before re-entering the child, in order to get medical attention for him.

Trachoma and keratitis have never been found among our school children, but if a case should occur, immediate care by an ophthalmologist would be insisted upon.

Foreign bodies in the eye are common and, when easily removed, are cared for at school. In cases where the object is imbedded, the child is sent to the physician.

Children returning to school following illnesses are frequently not yet built up to their normal strength and should be given eye care as well as general care. Occasionally, vision defects result from illness, particularly where the kidneys have been involved. An observing teacher will report such children if they have always had normal vision but complain of symptoms or appear to have eyestrain, and a visual acuity test should be given.

Safety Measures in School

One of the most serious problems is that of accidents. All precautions should be taken, as mentioned previously, in having equipment which is free from the possibility of accidents. Classes in safety should really be campaigns for prevention; they should promote an interest in games which are safe and a desire in the children to play them. Children should be taught to protect each other on their way to and from school and they should be directed in their play at school. They should not be permitted to throw

sharp missiles or run with sharp sticks. Firecrackers, toy pistols and knives should be prohibited.

Recently we had a minor accident which might easily have been quite serious. It occurred during the noon hour, when some of the smaller boys were enjoying a ball game. One of the boys was running to catch the ball, and, of course, kept watching it. In so doing, he ran into a fence and cut a small gash in the supra-orbital arch. It might easily have extended into his eye.

Similarly, a very serious accident did occur several years ago to a preschool child. A little boy ran into a fence from which a nail projected. It was at just the right height to puncture the eyeball. Although the little fellow had good care, his parents would not accept the advice of the ophthalmologist to enucleate the eyeball, and sympathetic ophthalmia resulted in the other eye, with loss of vision. The child is now in the Ohio State School for the Blind.

Not long ago a preschool child with a traumatic cataract was brought into the ophthalmologist's office. A year ago he was snapped in the eye with a rubber band, which probably caused uveitis. The parents did not notice any abnormality until the cataract became apparent. This probably is another case where it was thought foolish to consult a physician or specialist for the initial injury.

Machinery in school shops should have the same safety devices as similar machinery in industry, and students should understand how to use their tools before being put to work. They should not be permitted to work after school hours unless a supervisor is present. The same hazards exist here as in industries using similar machinery and tools, and immature workmen will take greater risks than the older men in shops. Laboratories should also be closed to pupils unless a teacher is present, and this applies to the home economics department as well as to chemistry, physics, and biology laboratories.

Not in every community are school authorities fully awake to the hazards and needs of visual care. Sometimes a personal experience helps to emphasize this aspect of school hygiene. My superintendent once had an eye burned very badly in a laboratory explosion and consequently was under treatment for nine months, with good results. Needless to say, he is anxious for every precaution to be

taken for the safety of our pupils and to have every care possible for their eyes.

Summary

Nurses working alone in communities will find help, advice and encouragement in various service clubs and interested groups within their communities, and particularly within their state in the departments of health, education and the Commission for the Blind. Much valuable material may be secured from the National Society for the Prevention of Blindness. By concerted effort on the part of all workers within the schools, surely the sight of the school children should be conserved and eye problems in education be more easily solved.

Study Facilities in College Dormitories

John O. Kraehenbuehl, Ph.D.

AN interpretation of a survey which was made of lighting conditions in the dormitory rooms of more than 2300 students; suggestions for improvements are made

THE study facilities in college dormitories or in rooming houses used by students are not adequate, nor conducive to prolonged and concentrated study. A survey of over 2300 student study surfaces shows that the illumination is such as to cause severe eyestrain which, in the normal college period of four years, may produce permanent disability. The education of the student and of the administration has been difficult in the past, for there have been so many conflicting data from various researches that the whole question of proper illumination and the amount of illumination needed has been championed by individual groups, each classed as experts, but of so little accord that the layman knew not which way to turn for information. In recent years much has been added to the knowledge of seeing, and the final test has been the satisfaction experienced by the individual who has had an opportunity to follow correct principles. When a person who has had occasion to use artificial illumination for a great portion of his work uses a surface lighted under the direction of one qualified to analyze the problem, he finds relief from eyestrain, a large reserve of nervous energy after a strenuous task, and rejects enthusiastically all the former methods: then, there is evidence of the worth of the installation. Having seen numerous students and administrators become enthusiastic exponents of the principles of good lighting, the author feels that correct information is available and that the time is here for intensive education among both the student body and the college administration. For those who attempt to carry the work forward there are many disappointments,

for, even when the idea is accepted, often there are miscarriages when the principles are applied, not through intent but through ignorance of the fundamentals.

Education and Demonstration

The principles of good illumination may reach the students through lectures and demonstrations or the actual use of well lighted study facilities. The illumination of a reading room using proper arrangement, quantity and quality of light is an easy way to acquaint the whole student group with the principles of good lighting; and placards advising the student as to how his or her study surface may be made as pleasant for work will form a direct appeal for the correction of a much neglected asset to comfortable study. Where one room lighted in this manner has been installed, there has followed such a demand for similar lighting in other reading rooms and classrooms that the administration has found itself facing a problem which it lacks funds to solve.

The student will neglect his eyes even when told by the health service that correction is necessary. Sometimes, when the co-operation of the parents is requested, the problem of the needed correction is solved. It is necessary to impress the student with the fact that, regardless of how perfect the illumination may be, no amount of arrangement or illumination will take the place of proper eye correction. In survey work it is frequently evident, when talking with the student, that a high illumination, which is unnecessary, is used in an attempt to make up a deficiency of the eyes.

The student does not analyze the economics of adequate illumination with the proper insight. When he is able to purchase a study lamp with inferior lighting characteristics for one dollar or less, he will not purchase a more expensive type without having the fact that the first is poor economy clearly analyzed. When shown that the investment is for four years, that the cost per year is very slight, and that eye correction and the loss of only a short time from his work are very expensive (based on his cost per day at school), he is the first to turn toward better study facilities. At present, the nearest approach to a perfect study lamp is totally indirect lighting equipment, which, for the proper quantity of illumination, is so expensive to operate that in most college dormi-

tories and rooming houses it must be ruled out. The Illuminating Engineering Society, after making an investigation of study surface lighting, has developed what is commonly known as the I. E. S. Study Lamp, which, though not perfect, attempts to combine proper illumination with economy of operation. The use of these lamp specifications has been licensed to reliable manufacturers, and the product is checked by laboratory test. Improper use of the best equipment may produce results as definitely injurious as the inferior grades of lamps used by the student.

Principles of Good Lighting

These fundamentals must be definitely understood and practiced by the student and advised by the administration if the resultant lighting of the study surface is to be effective and comfortable. The important items are listed below:

1. Amount of illumination in foot-candles. It has been found that 15 foot-candles on the work is very comfortable, if controlled.
2. There must be no glare, either direct or indirect. The first is accomplished by shading properly and the latter, by eliminating shining surfaces and reducing the source of brightness.
3. Illumination of the surroundings with a desk and lamp arrangement which permits of an adjustment to remove reflected glare. The surroundings should be illuminated to about 20 per cent of the average illumination on the work surface, and the desk should be, for a single individual, approximately 30 by 48 inches in size. The lamp should also be weighted for stability.

Many other items, such as heating, ventilation and size of room, enter into the problem of study facilities, but this paper will be confined to the one item of illumination.

With the student, the problem is one of education and demonstration, but with the administration, there must be an analysis not of the individual problem but of the group problem, which is best approached through a survey of the study facilities.

Survey of Student Study Surface Illumination

Organization.—As in other surveys, the important factor is organization, for, besides having a trained personnel, it is necessary to establish the objectives, and to have proper equipment and specifications so that various survey groups will not introduce personal errors into the data. Figure 1 shows a survey kit developed for making a survey of lighting equipment used by students for study. The foot-candle meter shown is a medium priced meter and could

Figure 1.—Survey Kit. Foot-candle meter, 50 foot tape, 6 foot rule, triangle, pencils, survey forms, scale, color chart, equipment chart, reflection gauge.

be replaced with one costing about half as much, with equally accurate results. Besides this one important item, there are charts showing the classification of both room and desk lighting equipment, and color charts for the classification of room coloring. A reflection coefficient indicator is shown, but these reflection factors may be obtained by use of the foot-candle meter with a higher degree of accuracy. Scales, rules, tapes, straightedges and survey forms are added for keeping records and measuring the room and desk dimensions. Training of the survey groups, where a squad of

Illumination Survey in Study Room 365 Wright Street

Lamps in Room

Number 3
Size Watts 25, 25, 40
Condition G G G
Location desk (R), center, dresser
Mounting Height 10"
(Desk level to filament)

Plan of Room

Length 12 ft.
Width 11 ft.
Height 8 ft.
Floor Area 132 sq. ft.
Watts per sq. ft. 0.67

Reflection Factor

	Color	Coefficient
Ceiling	18	42
Walls	18	42

Desk Dimensions

Length 40" in.
Width 25" in.

Type of Unit

Desk- Class B

Room- Class E - Center has no shade Dresser has yellow parchment shade

Horizontal Illumination of Work in Room

Location	Desk Height	On Desk
a	1	
b	1	3 / 12
c	1	38
d	3	32
e	2	12
f	1	3
g	1	24
h	2	7)124
i	4	17 5/7
j	9)16	
k	1 7/9	
l		
m		
n		
o		
p		
Average		

Range on Work
Max. 90
Min. 15

Illumination in plane of reading ftc. 30
Is Desk Surface Glossy? no
Does it Reflect Light Source? no
Illumination on Surface Faced 1
Remarks** Are Glasses Worn? yes

Single room
Light floors

Signature L. R. Rogers

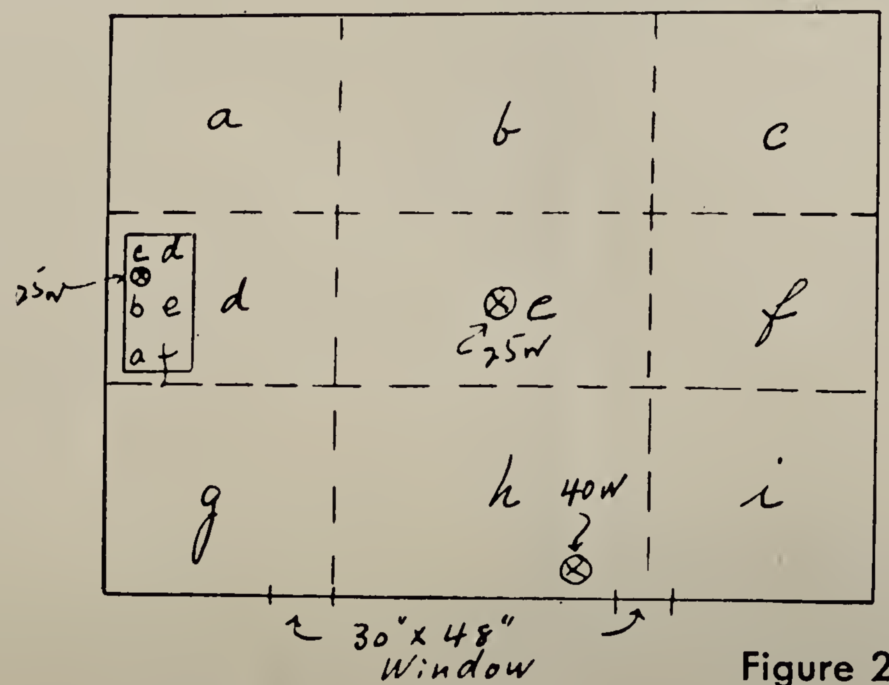


Figure 2.—Survey Form.

two observers proves the most satisfactory size, is best accomplished by practice in the field under the supervision of an experienced individual.

Survey Forms.—The survey form shown in Figure 2 is a modification of the one used by the Illuminating Engineering Society Committee in its original survey conducted by members located at colleges throughout the United States. The form shown includes studies of the desk location and the windows. In the tables given summarizing this survey, no mention has been made of daylight illumination, for most students study at night in their rooms, using

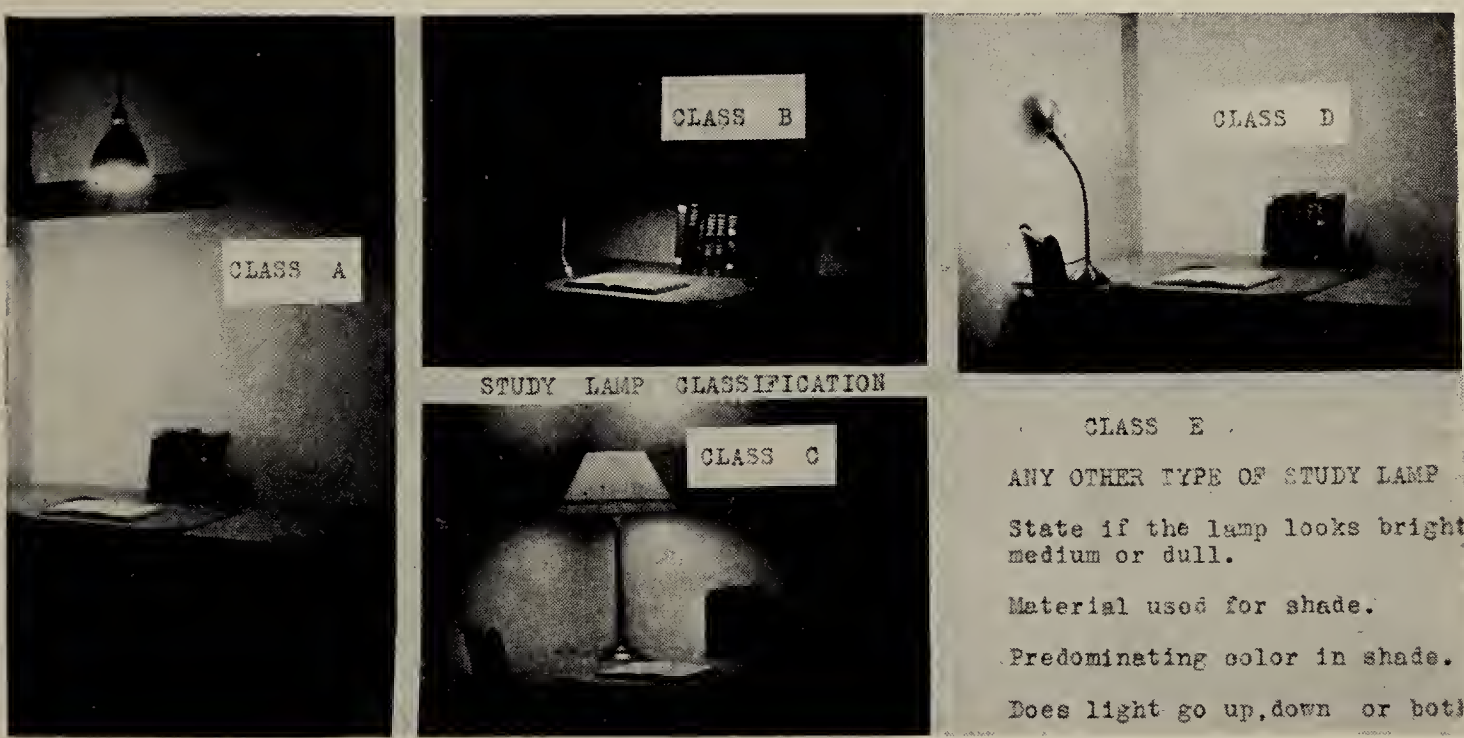


Figure 3.—Student Study Lighting Equipment Classification Chart.

libraries and classrooms for the greater part of the day. The data from the survey forms are tabulated on composite forms which allow rapid retabulation of the various items of interest into summaries. A preliminary survey established the desired survey form and the necessity for making a study of the lighting equipment in general use by the students. The survey was a means of disseminating information to the students concerning proper lighting and bringing attention to the defects of installations being used. An investigation was made of the lighting equipment in general use, and a qualitative rating was given each specific piece of equipment.

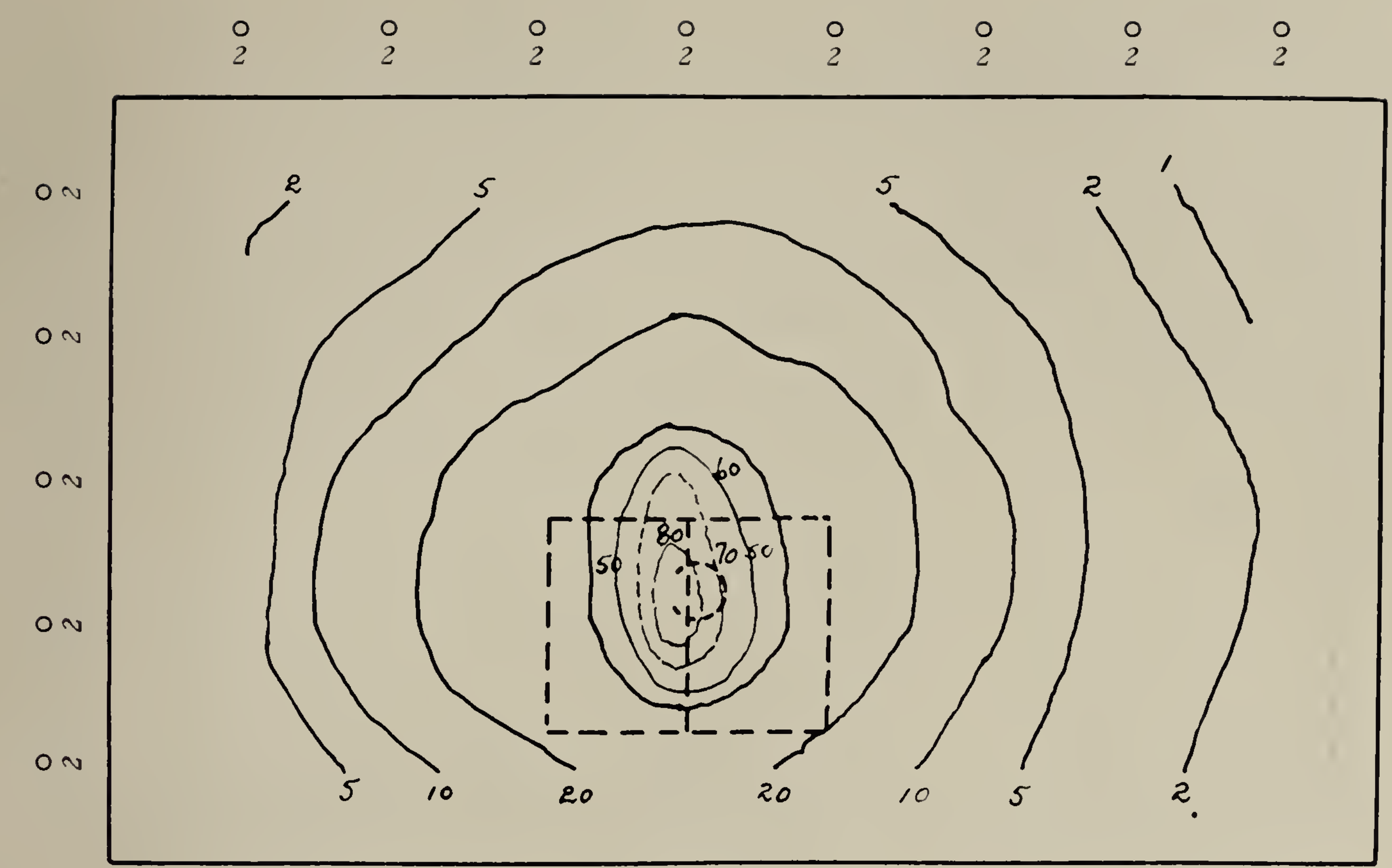
Types of Lamps.—Figure 3 shows the types of lamps in general use by the student. Class B, the goose-neck lamp, was all too

common. Class D was developed by following suggestions to students in lectures that, using a drop light and a goose-neck lamp with a reflector, would give a much improved lighting for study purposes. Class D fulfills many of the I. E. S. specifications but is more expensive to operate. The high percentage of this type of equipment shown in the tables is directly due to educational influence. Class A is a drop light which has some good points, and under Class E can be classified all types of decorative and freak lamps, which are in one class as to general worth. In some instances students were working with bare lamps covered with theme paper or located at such an angle as to eliminate direct glare.

Evaluation of Equipment.—To present an argument concerning the different types of equipment, it is necessary to develop some concrete basis of comparison. The statement that one lamp is better than another may lead only to a difference of opinion, and not until the two are compared in the light of definite weighted values for desirable and undesirable characteristics is it possible to present a strong argument. Since the types used by the student are few and the requirements for a good study lamp are specific, an evaluation of student lighting equipment is restricted to a narrow field of investigation.

If a point or numerical evaluation can be given to: (1) quantity of illumination; (2) uniformity of illumination; (3) glare; (4) shadow; and (5) ratio of general to work surface illumination, a coefficient may be obtained which represents the position of the equipment in a relative scale of merit. Items 1, 2, and 5 may be obtained by an investigation of the lux plot for the study and text surfaces; items 3 and 4 must be obtained by some arbitrary standard of comparison. These last two were evaluated by using a mirror for glare determination and a stick perpendicular to a test surface for the determination of the character of shadows. Glare may be interpreted in terms of brightness or candle-power per square inch.

The lux plots for the various types of equipment are shown in Figures 4, 5, 6, and 7. The isolux lines show the regions of equal foot-candles while the small circles indicate readings taken on the wall at eye level. The table was placed in the corner of the room,

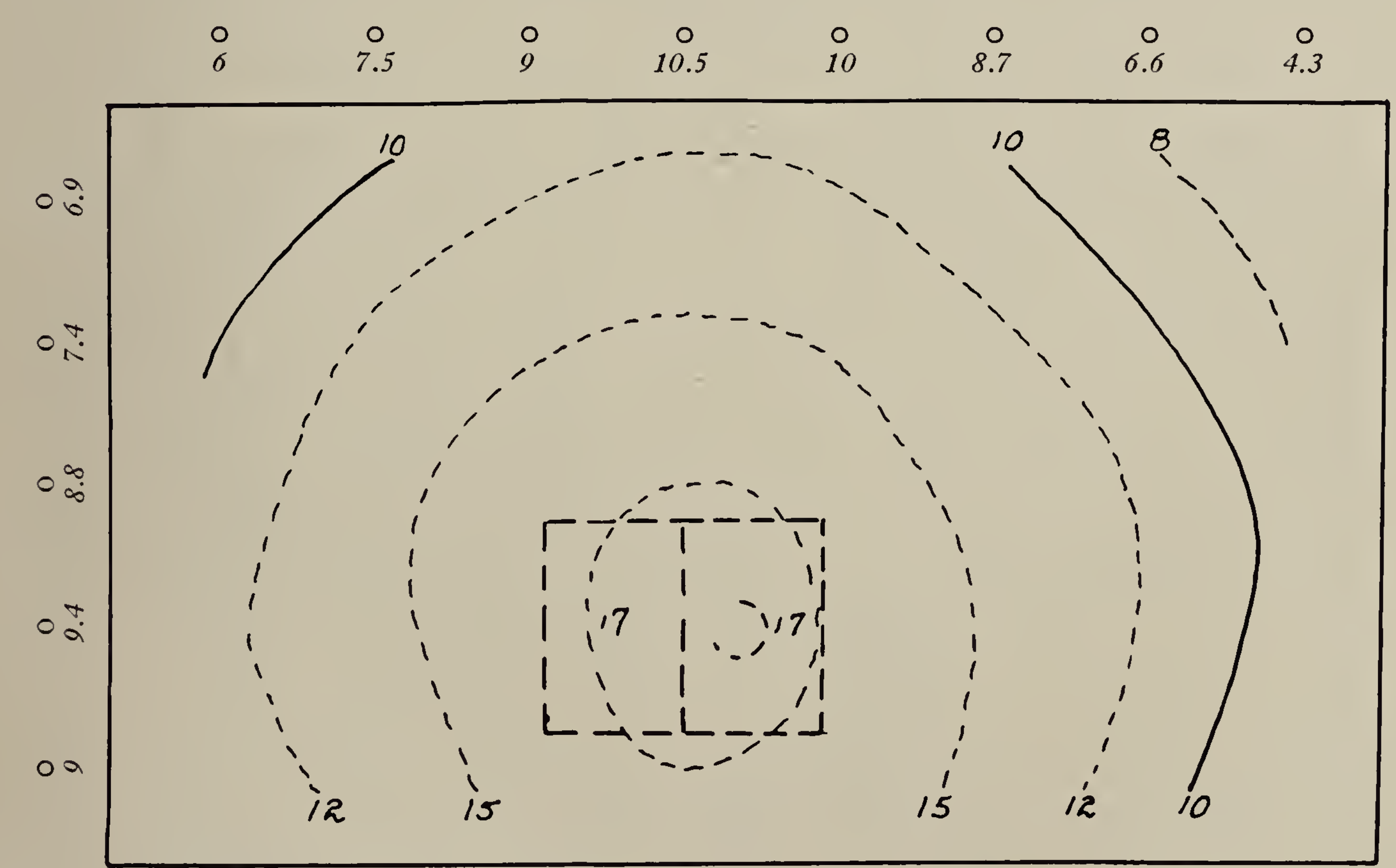


	Desk	Wall	Book
Max.	85.0	2	160
Min.	1.0	2	40
Avg.	14.1	2	85
Range	84.0	2	120

Distance of Lamp above Surface
11 inches
25 watt

All measurements in foot-candles

Figure 4.—Isolux Diagram for the Light Distribution of a Goose-neck Lamp.

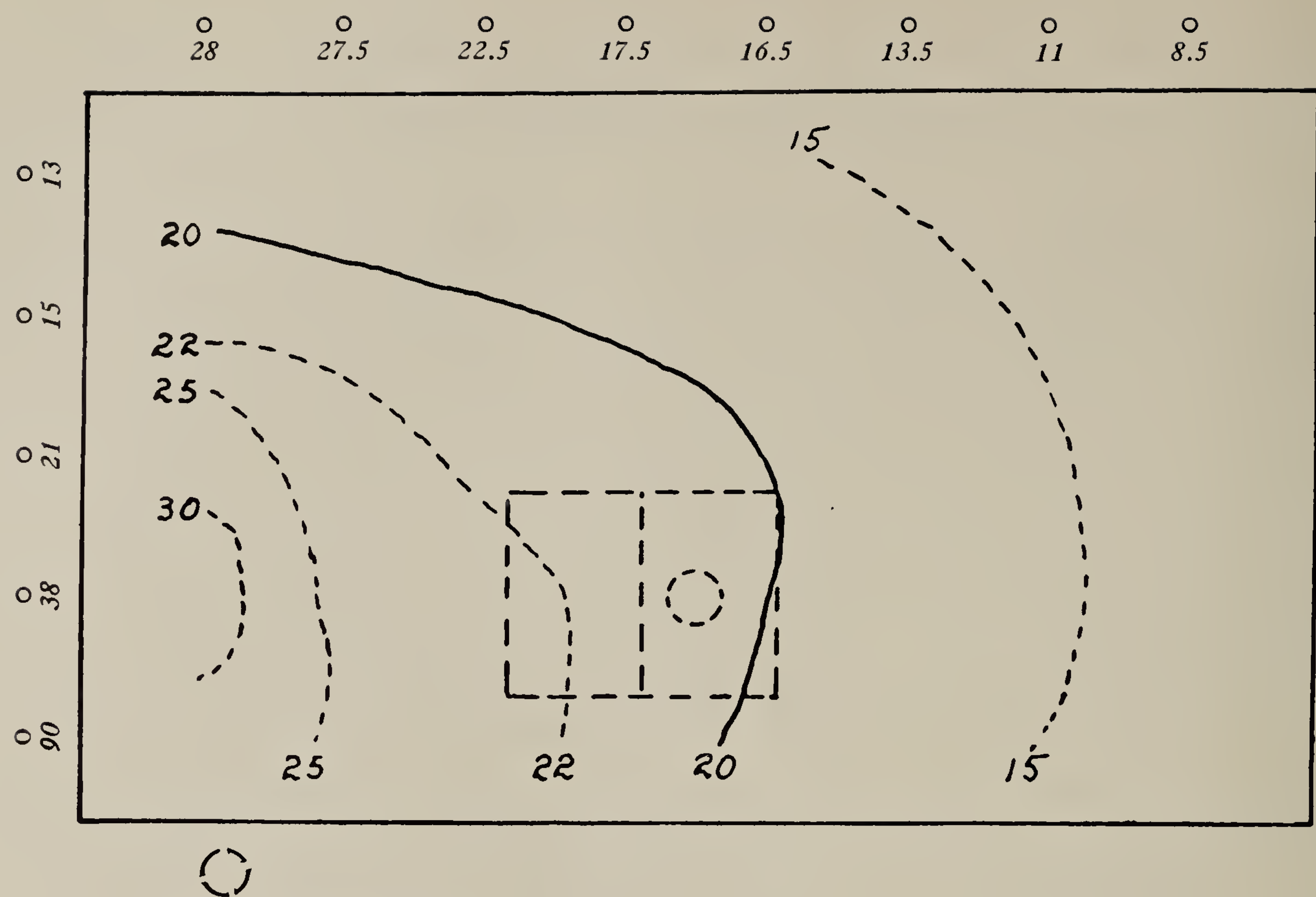


	Desk	Wall	Book
Max.	17.0	10.5	17.8
Min.	7.8	4.3	16.5
Avg.	10.6	8.0	17.2
Range	9.2	6.2	1.3

Distance of Lamp above Surface
45 inches Tracing-Cloth Screen
100 watt

All measurements in foot-candles

Figure 5.—Isolux Diagram for the Light Distribution of a Drop Light.

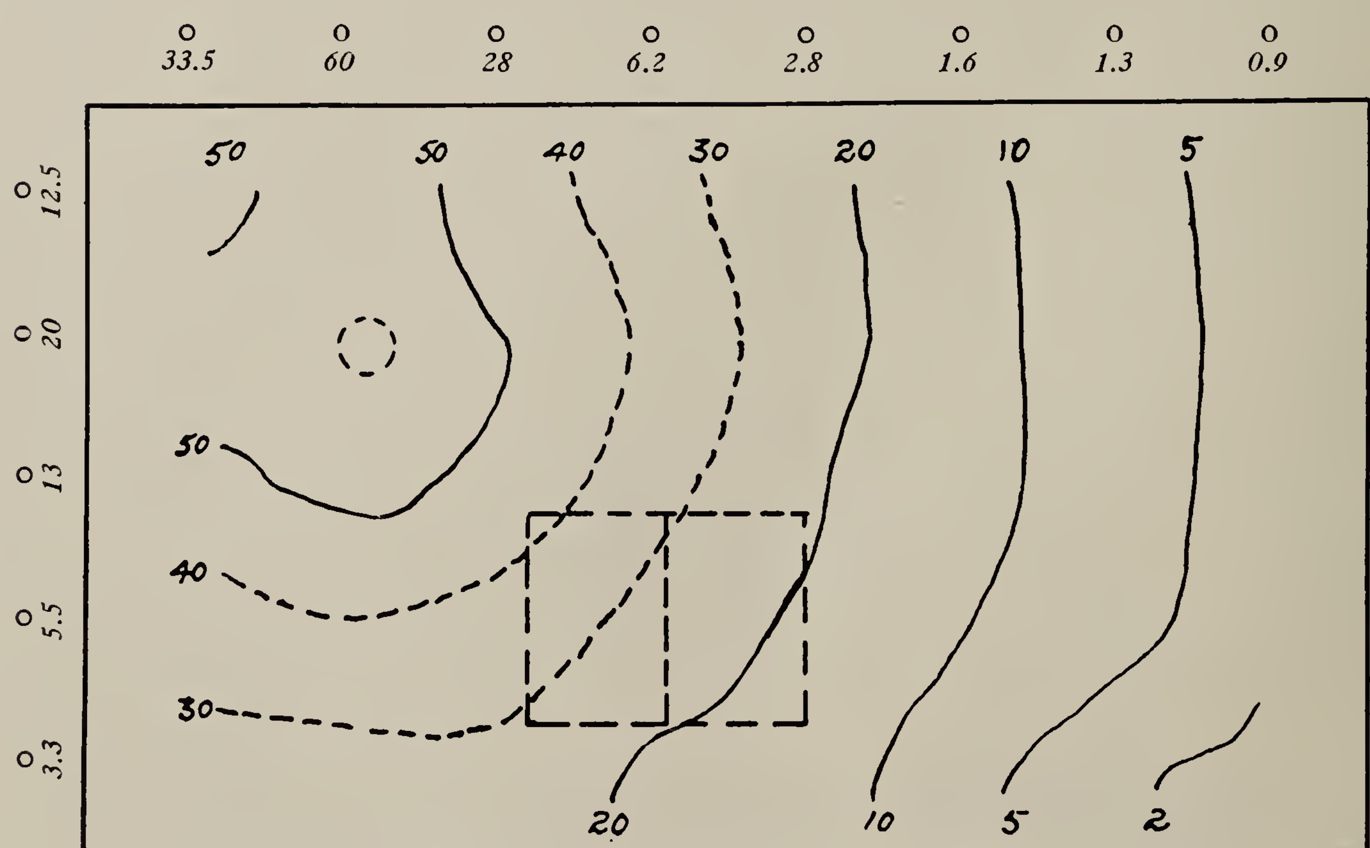


	Desk	Wall	Book
Max.	31.5	90.0	22.4
Min.	11.0	8.5	19.8
Avg.	18.8	24.8	21.1
Range	20.5	81.5	2.6

All measurements in foot-candles

Distance of Lamp above Surface
Top Lamp 45 inches, 75 watt
Side Lamp 20 inches, 100 watt

Figure 6.—Isolux Diagram for the Light Distribution of a Drop Light and Reflector.



	Desk	Wall	Book
Max.	58.0	33.5	37.0
Min.	1.8	0.9	15.5
Avg.	24.5	14.5	25.6
Range	56.2	32.6	21.5

All measurements in foot-candles

Distance of Lamp above Surface
25½ inches
100 watt

Figure 7.—Isolux Diagram for the Light Distribution of an I. E. S. Lamp.

since most student rooms follow this arrangement, but when the desk was placed along the side wall of the room, the significant readings were not altered. The figures include a tabulation of the maximum, minimum, and average of the foot-candles as well as the range on the desk, side wall and the text.

Table 1
RATING OF STUDY LAMP EQUIPMENT

	Size of Lamp in Watts	Quantity of Illumination	Uniformity of Illumination	Glare	Shadow	Ratio of General to Work Surface Illumination	Total Points	Rating
Goose-neck Desk Lamp.	25	3.7	2.7	1.0	1.0	1.0	9.4	D−
Drop Light (Tracing Cloth)....	100	1.7	4.7	3.0	1.0	4.0	14.4	C−
Goose-neck Lamp (Reflector)...	100	0.0	4.3	5.0	3.0	4.0	16.3	C+
Goose-neck Lamp Drop Light (Reflector and Tracing Cloth)....	200	2.7	4.7	3.0	3.0	5.0	18.4	B−
I. E. S. Lamp (Desk in Corner)...	100	4.0	3.0	3.0	2.0	5.0	17.0	C+
500 Watt Indirect Lamp..	500	5.0	5.0	5.0	5.0	5.0	25.0	A

A = Excellent. C = Fair.
B = Good. D = Poor.

Table 1 gives the rating (in points) for the various types of equipment. This enables the survey squad to point to the defects or merits of the lighting equipment when consulted by the student. The survey, in this manner, besides making available much useful information for presentation to the administration, likewise acted as a school for presenting to the student the factors involved in the illumination.

Tables 2, 3, and 4 give a summary of some of the important findings of the survey and a comparison of the lighting in some dormitory rooms which were changed after results of the survey were available. In Table 2, the distribution of the various types of equipment is shown: the men selected the goose-neck lamp, the women all types of decorative silk shades (which were low in quantity and poor in quality of illumination), and nearly 4 per cent of the student group used bare lamps. The survey shows that 95.3 per cent of the lighting equipment is poor and 4.7 per cent rated

Table 2

DISTRIBUTION OF TYPES OF STUDENT STUDY LIGHTING EQUIPMENT BY PER CENT

(Classification according to Figure 3)

Type	Women			Total	Men			Total
	Sor.	Res.	Ind.		Frat.	Ind.	Total	
A	. .	. .	. .	. .	. .	4.84	2.00	1.05
B	29.72	35.90	36.79	34.02	91.58	81.04	87.22	62.12
C	. .	1.19	0.52	0.54	0.41	3.10	1.52	1.05
D	. .	. .	0.52	0.18	3.80	5.99	4.71	2.57
E	62.97	61.72	49.74	58.04	3.80	3.29	3.59	29.29
None	7.31	1.19	12.43	7.32	0.41	1.74	0.96	3.92

2373 positions studied
(A, C, D) 111 positions good and satisfactory—4.7%
(C) 25 positions satisfactory—1.1%
(E, B, None) 2262 positions poor—95.3%

as good. At that time, only 1.1 per cent of the students used I. E. S. specified lamps, but at present there are about 20 per cent of the students equipped with this type of lamp, following a lighting campaign inaugurated by the student paper.

Other Equipment.—Table 3 lists other requirements besides the lighting equipment. The students are confined to the use of very small work surfaces in the nature of small tables, often of the kitchen table type, so that, even with the best equipment, it is impossible to place the lamp in such a position that there will be no glare from the glazed paper usually used in book making. Even worse, in many instances two students were using one desk, making

it impossible to adjust the lamp in the best position for either in the confined limits of the surface. Table 3 is self-explanatory. The desired listing, which was determined from research in the laboratories or from investigations by those interested in the problem of illumination for proper seeing conditions, is directly compared with the reported per cent of satisfactory study positions. Unfortunately, though the percentages indicated that there should be a reasonable number of properly arranged and lighted study positions, where one condition was met, others were neglected, and in the whole survey not a single position could be considered ideal.

Table 3

Analysis of Student Study Lighting

Detail	Desired	Reported Satisfactory
Size of Study Surface	32″ x 54″	5.5%
Type of Study Surface	Dull	83.2%
Study Surface Reflection	No Specular Image	74.3%
Type of Lighting Unit (Figure 3, B)	A, C, or D	4.7%
Mounting Height of Lamp Filament	25 ± 1″	4.6%
Average Foot-candles on Work Surface	15	64.1%
Average Foot-candles on Surface Faced	5	40.1%
Average Foot-candles on Text Book	25	43.6%
Glasses Worn by Students	40% College Students Defective	42.0% Corrected
Size of Incandescent Lamps	100 Watt	1.8%
Watts per Student	100 Watt+	26.9%
Watts per Square Foot	1.5+	13.7%
Reflection Coefficient (Ceiling)	80%	8.7%
Reflection Coefficient (Sidewall)	50%	94.5%

Table 4 is a study of a series of dormitory rooms before and after the arrangement of the room had been changed and I. E. S. specified lamps had been installed. There were many features neglected in this installation, not by intent on the part of the administration but because of an incomplete comprehension of the

problem involved. In this instance, the lighting was very much improved. Whereas the students had continually complained to the matron in previous years, there were no such complaints during the first year of operation.

Table 4

Comparison of Dormitory Student Study Surface Lighting Before and After Lighting Change

Selected Number of Rooms Reduced to Unit Base

Items	Before	After
Number of Lamps	2.5	1
Average Watts	112.5	150
Height of Lamp Filament	12.2″	25″
Watts per Square Foot	0.93	1.28
Size of Work Surface	24″ x 38″	30″ x 48″
Type of Study Lamp	Various	c
Average Foot-candles in Room	3	6
Average Foot-candles on Desk	19	20.5
Average Foot-candles on Text	15	22
Average Foot-candles on Surface Faced	2.8	4

Responsibility of the Administration

When the study of lighting conditions and equipment has been investigated by responsible organizations—and this can be accomplished under the direct supervision of the administration itself—the administration has the problem of educating the student to the proper use of lighting equipment and of supplying such equipment in the dormitories or making it available for the rooming houses. The administration is the only organization that can enforce the use of proper lighting for study since it holds the responsibility of the dormitory and, likewise, is the enforcing power in the students' contracts with the rooming houses. Several schools have been recognizing the responsibility of this phase of the students' educational requirements even more than their responsibility in classroom lighting.

The attitude of some colleges taking the lead in the improvement of student study surface illumination is best expressed in quotations from their regulations:

"Because of the importance of good lighting for study purposes, the University requires that all study places for students in private rooming houses and fraternity or sorority houses be furnished with lighting equipment meeting the approval of the University authorities. Lighting equipment such as the 'Better Sight Reading Lamp,' whose specifications are approved by the Illuminating Engineering Society, or equivalent is required. Students living at home are expected to safeguard their vision by the use of proper equipment."*

"Each man, if he desires, is entitled to 100 watts of electric light. Tenants wishing to use I. E. S. lights must furnish lamp complete."†

These two quotations will serve to show that administrations will co-operate in the problem of student study lighting if the problem is presented to them, because educators recognize the fact that approximately 80 per cent of all learning is acquired through the eyes. The protection of the eye and the release of wasted nervous energy because of the elimination of eyestrain make for study, and this increases the usefulness of the college period in the development of viewpoint and the accumulation of specific knowledge for professional use in later life.

Summary

The improvement of the student study surface lighting and the parallel requirements for the use of proper lighting equipment may be listed under four heads:

1. An educational program, which includes both the administration and the student body, on the proper lighting requirements and the loss of nervous energy through improper attention to the requirements of the eyes.
2. The accumulation of data on the equipment that is being used and a survey of the conditions under which the student is working.
3. The furnishing of good lighting equipment by the administration in the dormitories that it operates.
4. The passing of regulations by the administration which will govern the student in rooming houses, fraternities or sororities where the lighting equipment is not a part of the college physical plant.

* *Marquette Student Handbook.* Marquette University, Milwaukee.

† *University of Illinois Lodging House Agreement.* University of Illinois, Urbana.

Each part of this program has its place in the complete problem, and the neglect of one item will necessarily weaken the results that are obtained. The greater portion of the faculty and the administration understand as little as the student the requirements for good study lighting. For this reason, the starting point is an educational program for which the stage has been set by commercial advertisement, making the people conscious of the necessity for more and better light. If this educational movement is not inaugurated at a very early date, there will be much damage done by the five-day lighting specialist, who preaches good lighting with a foot-candle meter and marks his results on an increased watt-hour consumption sheet which is the gauge for promotion and salary.

Social Interrelationships in Sight Conservation*

Lena R. Waters

THE importance of translating the scientific discoveries of today into tools which can be used efficiently in programs for disease prevention is stressed. The author also indicates that medical social workers have a unique opportunity to render valuable help in such programs

WE are gathered here because of our mutual interest in preventing blindness. I bring you no new thought, but will hope through a review of my conception of the scheme of life to stimulate the thought that is already yours, and to reinforce my own faith in all that seems worthwhile.

In any discussion of prevention of disease in people, one must of necessity consider the individual and all that concerns him. One considers the influences of the past and of the present and the goal to be attained. What is it that one seeks in life? Is it contentment? Is it happiness? Are the two terms synonymous? What are the ingredients for a satisfying life and how are they attained? The answer differs for each one. Individuals are not standardized—therefore, relationship between individuals continues interesting. The requirements for personal satisfaction vary with each generation and differ as our heredity and environmental influences differ.

Dr. Richard C. Cabot of Harvard University tells us in one of his stimulating publications that the ingredients for successful living are opportunities for "work, play, love and worship." Dr. Austin F. Riggs in his book, *Intelligent Living*, states that we are most likely to be happy if we can achieve a balanced life, and that to

* Presented at the Annual Meeting of the National Society for the Prevention of Blindness, New York City, December 11, 1936.

achieve this balanced life there should be included opportunities "for work, play, rest, leisure, contemplation, and last but not least, physical fitness."

Hendrik Willem Van Loon, in his *To Have or To Be—Take Your Choice*, says that the purpose of life is to achieve happiness, and he states "that man (woman or child) is happy who is able to play the rôle which satisfies him most completely in his own eyes." Perhaps I mean the same thing when I say that happiness depends upon our continued ability to participate in the molding of life, the opportunity to struggle, to increase strength through success over obstacles, for each success brings with it new strength, new knowledge and, therefore, new obstacles in the form of higher goals, standards, ideals.

All progress is struggle. The revolutions of the past and the revolutions of the present are the labor pains of a new development—a new step forward in civilization. Our forefathers gave us the impetus and surrounded us with the opportunities to continue to march forward.

In a few short years we have witnessed the miracle-like changes due to the inventions and discoveries of modern science and industry. These discoveries have not been possible except through knowledge of the efforts of the past and painstaking and ceaseless struggles to tear apart the curtain dividing cause and effect. Benjamin Franklin gave us electricity and Edison spread its use. Alexander Graham Bell gave us the telephone, and Marconi, wireless telegraphy. Dr. George R. Minot gave us liver therapy. Dr. Charles H. Best and Dr. Frederick G. Banting gave us insulin. Dr. Credé of Belgium taught us the relationship between gonorrheal infection and ophthalmia neonatorum and educated us in the use of the tiny and effective drops of silver nitrate.

There would have been little value in these discoveries by the great scientists, however, had they not been made available for use. Their use was dependent upon the education of individuals and groups of individuals in their use, and to available resources within the reach of the consuming public. We, each of us, seize upon and use those resources which we believe will speed us toward our selected goal and we discard the use of those which have no meaning for us.

The most universally accepted goal sought by man throughout the ages has been an opportunity for sound mental and physical health in order that he may be free to live life. Since the beginning of time he has sought health. We have seen the science of medicine struggle from the stages of superstitions and witchcraft, through the study of mind and matter, up to its present high place of achievement. We have seen medicine carry with it improved individual and community health. We have been taught the relationship and the interdependency between social living and sound health. We have seen scientific medicine accepted not merely as an individual matter, but as a responsibility of society as a whole. Great institutions of medical learning have been encouraged and supported through philanthropy and tax funds. Through the public support of scientific medicine, great strides have been made in the organization and development of state, county and city departments of public health. Science has taught us preventive medicine and is joining hands with the public in making it available for use by each and all of us.

There has never been a time in the history of mankind when the opportunity for a satisfying life for each of us was greater. Space has been eliminated, hand labor has been reduced to a minimum, and many devastating diseases are under control. Yet we continue to have poverty and illness, and millions of people are permanently handicapped through preventable diseases.

The development of resources for a wider spread of education in measures for prevention must be continued and must swing from the speed and rush and complicated organization of the great cities to the isolated and primitive life of remote rural areas. The services of prevention and treatment cannot be limited to any one group of society. They relate to the whole. The rearing and education of the children of the poor do not essentially differ from the educational needs of the children of well-to-do parents. Disease knows no class distinction and strikes alike the colored and the white, the rich and the poor.

Medical social workers, more than many others, have a unique opportunity to render valuable help in programs for disease prevention. The use of hospitals and clinics is increasing in flood-like volume. In 1873 there were, in the United States, 149 hos-

pitals containing 35,000 beds. In 1931, the American Medical Association registered 6,613 hospitals with 974,115 beds. In 1900, about 114 years after the first dispensary was organized, there were 100 dispensaries in the United States. Between 1910 and 1930 the number of clinics had rapid growth, and today there are approximately 6,000 clinics in the United States, with a record of approximately 30,000,000 visits annually. To these clinics come all ages, races, and types of people, with every known disease. Day after day, hospital workers observe the tragic results of unused opportunities for prevention. Medical social workers are aware of the relationship between diseases. They are taught the influence of diabetes, tuberculosis, syphilis, and malnutrition on eye diseases. They know the folly of attempting treatment of a part without treatment of the whole. They know that an infectious disease in one member of a family is a warning signal of possible infection in other members. The infected eyes of the newborn babe point to the necessity of examination of his mother and his father, his brother and his sister. One is shocked by the findings of such studies as *Maternal Mortality in Philadelphia*, by Philip F. Williams, M.D., and the study of *Chronic Illness in New York City*, by Mary C. Jarrett; by the findings of the American Social Hygiene Association; and by the figures and reports presented by the National Society for the Prevention of Blindness.

One wonders why people are ignorant and indifferent. Why do they not co-operate? Why do we have to have so much follow-up to insist that people take measures for their own health and happiness? Is it because we ourselves are ignorant? Are we satisfied to follow-up rather than to lead? Does the patient understand the meaning of his disease and his part in treatment? The law of self-preservation and not perverseness makes one resist that which one does not understand. How wise are any of us when faced with a new experience? In any situation we react in the light of our past experience, and our future attitudes are modified by the new experience through which we are passing.

Studies have been made in hospitals, from time to time, on this question of follow-up of patients. You are familiar with the studies which have been made on follow-up in cases of glaucoma and other eye diseases. An interesting study was made in 1930 under the

supervision of Miss Louise A. Brown of the Department of Social Service of the Hospital of the University of Pennsylvania, and published in the *American Journal of Syphilis*, October, 1930. The objective of this study was to learn the reasons for the patient's failure to continue his treatment. The returns were embarrassing. We learned that "financial difficulties, unsuitability of hours, shortcomings of the clinic personnel in establishing rapport and educating its patients, and painful or incommoding reactions to treatment, are, in varying proportions, depending on the method of analysis, the overwhelmingly prevalent causes for the failure of patients with syphilis to continue under treatment until discharged." We learned that 85 per cent of the reasons for lapse are capable, to some degree, of adjustment.

In the efforts to develop wholesale methods for treating wholesale problems, the strength to be preserved and built upon in the individual units of society must not be overlooked. After all, who has greater concern for his own welfare than the individual himself?

Those of us in the medical world have long since learned that treatment cannot be imposed on a patient. Treatment is a partnership business and the patient is a very important partner without whose co-operation little in the way of successful treatment can be expected. In a profitable partnership each must seek to understand the contribution which each is prepared to make. There must be mutual respect, which implies a give and take between two personalities, with an appreciation of the right of each to his own attitude.

The problems with which a patient is faced are many and varied. The entanglements of poverty, fears, unhappy homes, the superstitions of ignorance, lack of educational opportunities or of personal resource to meet the exceptional need—these, and many others, are faced by individuals when overcome by disease. The medical social worker must include in her particular equipment, not only an understanding of the sick person and all that concerns him, but a knowledge and skill in the use of community resources. She shares her information with the patient and helps him to select out of the resources those which will meet his special need. Through the medical social worker, the hospital and other community agencies are closely allied in the program for health, learning from

each other, pooling their resources, and truly co-operating for the benefit of the individual patient and for society as a whole.

A case which illustrates one of the problems not infrequently seen in a department of social service is that of a three-year-old colored child:

"The patient, the older of two children, is on Ward 0, with interstitial keratitis probably due to congenital syphilis. Following her previous hospitalization for phlyctenular conjunctivitis she returned home, but her condition became worse and she was re-admitted. While on the Ward, the eye condition rapidly improved. A good hygienic program and adequate diet with limitation of sugars, together with regular treatment for lues in the Dermatology Clinic, comprise the suggested treatment. Mother, age 21, said to be unsystematic in her care of the children because of employment outside the home, is unable to carry out instructions. Patient and her sister are cared for partly by stepfather and by maternal grandparents who are well meaning but ignorant. Patient's diet has been devoid of vegetables and fruits. Parents are confused as to child's medical condition and suggested treatment."

The question faced by the patient's mother is whether she shall continue her independence by day's work which takes her away from her family, or whether her greater responsibility is to her children. She decided for the latter, and was directed by the social worker to a relief agency which very willingly gave her sufficient relief to maintain her home and to give the personal care which her children so much needed. It became necessary in this case to examine and treat this mother for syphilis and, through her, to bring in for examination and treatment the unmarried father of her children. This group was entirely co-operative, but from time to time aid, through the direction of the visiting nurse, through supplementary aid of glasses, and supplementary financial help at times of acute illness, was required. The mother worked out her own and her children's problems, but in doing so she needed and was given the help of a group of community resources with which she had not formerly been familiar.

Growth comes through individual effort and through group effort. They are interdependent. Groups create opportunity and point the way. The individual himself will use these opportunities to the degree to which he understands their relationship to

his own situation. My concern is that each patient or potential patient may himself have a share as an active partner in this campaign for prevention.

The interrelation between one's social living and disease is obvious. Measures for preventing disease include consideration of all that concerns an individual. There seems to be no other field for prevention in which this interrelationship is more strikingly seen than in the field of prevention of blindness; for instance, prenatal health, safety in recreation, individualized opportunities in schools, lighting in industry, control of infectious diseases and, above all, a healthy home with informed individuals who will know how to use the resources for education and health which have been provided for them.

The goal of man is freedom, independence, self-sufficiency and an opportunity for personal development in order that he may be unhampered in participating with his fellows in enjoying life and adding to knowledge.

Current Trends in Ophthalmology*

A. D. Ruedemann, M.D.

OUTLINES the progress made and the goal sought in caring for the eye problems of the school child, as well as the advances made in the technique of treatment of the most prevalent eye diseases, hereditary defects and eye injuries

PROBABLY all of you are aware that twenty years ago ophthalmologists established an unprejudiced board to qualify men to practice this specialty and the plan has now been adopted by practically all special branches of medicine. The value of this practical quizzing lies in the fact that it makes for better preparation; it brings out weaknesses in the preparation and, as a result, a better trained group of men are practicing ophthalmology. The value of this is readily seen since good preliminary training and good practice are synonyms in medicine. Good practice of ophthalmology is the best prevention for blindness there is. The earlier and the more accurate the diagnosis, the better the end result; all of us know that there is not a single eye disease that leaves the eye in as good condition as before the attack.

Ophthalmia Neonatorum

We no longer see so many cases of ophthalmia neonatorum but we still see them. This is one disease that may be controlled but it is not permanently eradicated. It must be watched constantly because the minute vigilance is relaxed, new cases appear. The treatment for ophthalmia is now much more satisfactory both in children and in adults. In the past ten years, the prognosis has changed from hopeless to good in adults. This has been brought

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about by more adequate treatment and the use of fever therapy, especially the heat cabinet. Gradually, this scourge to sight has been brought under control but the disease is still present and, even though treatment has improved, vigilance must be maintained because it is early diagnosis and early treatment that produce the best visual results.

Syphilis

Syphilis, the second great cause of blindness, is still with us. All of us are familiar with congenital interstitial keratitis but we do not realize the tremendous number of patients who are still afflicted with this and other forms of syphilis. There is no other disease which can manifest itself in so many forms and all of them bad. It makes little difference whether one loses eyesight by atrophy of the optic nerve or whether one goes mentally blind, it is still blindness. In spite of all the new methods of therapy and the new drugs which have been found useful, syphilis is still the great plague. No other disease requires the thoroughness of treatment, the skill in handling and the duration of time that this one does. Advancement has been made through the use of fever cabinet, foreign protein therapy and malarial treatment. Drug therapy is still the most commonly used and the most valuable, but in those cases in which eyesight is involved only a well-trained syphilologist and a careful oculist should treat the patient. Harm may be done by improper treatment and the therapy should not be directed so much toward a negative blood Wassermann reaction as toward a good functional result.

When we become familiar with syphilis in all its ramifications, its public cost and its tremendous burden to society, then, and only then, will this disease be better controlled, and this can be accomplished only by public health records of all cases and the use of those records. One hears more and more demand for this, and it must come if we are ever to lessen the number of congenital luetics and protect the mass of innocent people affected every year. It is perfectly stupid to go on year after year attempting to save lives and eyes when all our experience with infectious diseases teaches us that the best method of control is through a health bureau.

Tuberculosis

The third major eye infection is tuberculosis, which is difficult to diagnose and difficult to treat. It has a tendency to recur, is progressively destructive and produces considerable loss of vision. The most favorable form of treatment is complete bed rest during the active phase, high vitamin, high caloric diet and, later, some tuberculin vaccine. Like other forms of tuberculosis, the best treatment is rest, both local and physical. It is a common disease and has many forms of attack. The diagnosis is important, as removal of foci and fever therapy during an acute phase may stimulate the attack.

Hereditary Defects

Prevention is always cheaper and better than cure. Disease or physical defect has never improved the race; therefore, in those conditions where we can give advice for their prevention, we should do so. The transmission of known hereditary defects, of which we see our share, is fairly common. For this reason, people who have known transmittable defects should be controlled. There are now very good maternity centers and it might be advisable to instruct those in charge regarding ocular defects that are transmittable. The public's ever-increasing knowledge of heredity and education in the schools will naturally aid in this respect. Today, we still are in the dark ages as far as control is concerned, but we may advise the patient and hope that the advice will be followed.

Injuries

Last year there were 36,000 deaths and more than 300,000 injuries due to automobile accidents, and 20 per cent of the number injured suffered some visual defect. Most of the accidents are preventable, and where the law is strict in licensing and sentencing indifferent drivers, few accidents and few injuries occur. What is to be done for the ever-increasing mass of derelicts produced by trauma? These individuals are a tremendous economic burden—the majority cannot afford the initial cost of medical care to say nothing of maintenance later. There always will be accidents—and most of them are caused by carelessness, stupidity, and poor eyesight. The law that requires a railroad engineer to have a

definite standard of vision and to maintain it should be applied to automobile drivers. We of the medical profession should support measures to regulate driving and help protect the public from themselves.

Detached Retina

To return to ophthalmology, there has been, as you all probably know, a real advance in the treatment of separation of the retina (detached retina). The use of diathermy or cauterization of the choroid is successful in over 50 per cent of the cases if it is well done, and most of the cures are accomplished in the early cases. It is always good judgment to try to save an eye unless one knows that the fellow eye will never go bad. Surgery for the separation of the retina should be attempted and re-attempted; very few eyes are lost through surgery. The technique is constantly being improved and more patients are being operated upon, with the result that an increasing number of patients have their sight and more patients are willing to have something done for this previously hopeless eye condition.

Glaucoma and Cataract

As you know, the two great hazards to adult sight are glaucoma and cataract. Glaucoma is still the demon disease of ophthalmology. It may be painless and produce blindness by its insidiousness or it may, in one foul move, cause tremendous pain and blindness. Let us not forget that glaucoma is a disease not to be tampered with; the suspicious case must be thoroughly investigated and the facts presented to the patient. Glaucoma must be controlled by drops or by surgery if sight is to be retained and the patient must be under constant observation—his eyes are always on probation. Glaucoma is not a hopeless condition and most cases can be controlled and sufficient, efficient sight retained to carry the patient through life. New surgical procedures are constantly being brought forward—during the past year, Dr. Hans Barkan has developed a new surgical technique which will aid in the treatment of certain types of glaucoma. There may be an increase in the intra-ocular tension one day, or part of a day, and then it may be gone entirely for a day. Uncontrolled glaucoma means blindness, and procrasti-

nation is frequently the difference between economic vision and blindness.

When one talks of glaucoma, one has a natural tendency to think of cataracts. There are all kinds of lens changes and they may be due to many causes. It is safe to say that up to date the clearing of lens opacities is unsuccessful, but it has been shown that some of the opacities due to some systemic disease may be halted, with the preservation of sight. It is well to know that the fear of eye surgery is probably matched only by a patient's fear of brain surgery. Surgery should be performed only when it promises definite benefit to the patient and then it should be done when it will be of the most benefit.

Allergy and Deficiency Diseases

Allergy and deficiency diseases have recently been recognized as etiologic factors in ophthalmology. Allergic changes have long been recognized in other parts of the body but only recently have we come to realize that the eye, in as many ways, is also involved. Chronic, low-grade, recurring ulcers, chalazia, uveitis, and involvement of the discs are not uncommon. Acute flare-ups are numerous during the hayfever season and some patients have a peculiar individual sensitivity to chemicals, dust, etc. The important thing to remember is that these low-grade recurring ulcers and irritative processes in themselves may produce economic blindness and may so alter the condition of the eye that the way is paved for other conditions which will produce further loss of vision.

Of the drugs, the chief offender among women is face powder which contains orris root. Among men, the chief offender is either alcohol or tobacco, and it usually affects the individual who has a special sensitivity to the grain from which the alcohol is made and to the tobacco itself. In the treatment of eye lesions in patients suspected of having allergy, it is well to remember that the drugs used, including the cotton bandages and all detail substances, must be tested on the patient, and this is especially true with the drugs used in the treatment of chronic recurring ulcers. Several drugs are quite common irritants—they are atropine, butyn, dionin, and the mercury salves. When in doubt, a substitute drug should be found.

Strange as it sounds, dietary deficiency is common and this is

true because many people lack the knowledge to eat properly and others lack the funds. There are two main periods in life when humans may not have a properly balanced diet—up to six years, when they must depend on a mother's intelligence or lack of it to regulate their diet, and then later, after the active growing period. During the active growing period, children will, as a rule, eat everything and in this way get sufficient food to balance any type of diet. Following this, however, comes the age of discretion, of self-diagnosis and of diet. We now eat as we please and the things we think we know are good for us and, therefore, this is the second period of deficiency. There may be a deficiency of vitamin A, B, or any one or all of the others. We are now making more and more diagnoses of deficiency diseases and some of the eye conditions heretofore considered as idiopathic will fall in this group—rapid retinal fatigue, photophobia, and such known diseases as nyctalopia, and keratomalacia. Do not forget that the food we take in may be poisonous to us or that sufficient amounts of certain foods may not be taken in to supply the need of the individual for his or her job. We are testing out an apparatus, called the bio-photometer, which measures the light threshold and, as such, this also measures retinal fatigue and recovery, which is a function of the visual purple. This visual purple is derived from vitamin A. Mr. Frohring, of Cleveland, has developed this excellent apparatus and from our experience it apparently is a good clinical test for vitamin A deficiency. A point of interest is that a high percentage of patients with cataract are shown by this apparatus to have a definite vitamin A deficiency.

Eye Problems of the School Child

There are several new angles to the problems of the school child. First, it is becoming more and more evident that school children should be refracted and their ocular muscle balance tested before they enter school. This should be part of the preschool requirements and much time and worry could be saved for both the parents and teacher if youngsters were grouped according to their visual rating and this record followed in the instruction. The number of special study classes could be increased and intermediate groups could be arranged between those requiring sight-saving classes and

those with normal vision. To me, as well as to all of us in ophthalmology, this is one of the most important problems in our educational system. We realize that you cannot depend on the individual or his parent for good preventive measures but supervision must be directed in order to save waste of time in school. These visually handicapped youngsters must be protected against nervousness and unhappiness in school.

Definite progress is seen in the field of eye muscle training but there is still room for tremendous improvement, especially in the handling of the manifest squints and the prevention of blindness in the one eye that squints. Much could and should be said in regard to this group of patients. First, our method of handling them is inadequate—if paralysis of an arm or leg were to develop, immediately there would be a dozen institutions ready to receive the youngster. This is excellent, but a youngster with two functioning eyes is allowed to lose the use of one because we have not been able to evolve a system of hospitalization which provides for the continuance of education and treatment to prevent so-called amblyopia ex anopsia which is just another way of saying one is blind in one eye. Our failure is due to two main factors—first, lack of co-operation by the patient or his mother, either because of lack of time, funds, intelligence or just plain indifference; second, the lack of medical direction throughout the period necessary to secure good results. It is a complex problem but the end result, which is eyesight, is a most valuable one. Just now I have a man with a retinal detachment which is inoperable; the other eye is amblyopic and refuses to make any return to sight—he is unable to read, unable to carry on and now must be cared for.

Eye muscle surgery is an adjunct to the training of ocular muscles, but it is never the cure of amblyopia ex anopsia. It is rarely possible to eliminate training exercises and the type and time of surgery must be incorporated in the muscle training routine as the procedure necessary to carry the patient forward.

The handling of the youngster with a muscle problem requires serious consideration. More rigid and certainly more constant attention must be given to muscle training. Much can be accomplished, and we are all desirous of getting a good result, but good results require time, effort, apparatus, intelligence, and co-operation.

Half-way measures are worthless and present a further problem in that these patients, if not carried through to muscular stability, represent in later life the large number of the group of nervous, irritable people, high-strung people. The amblyopic patient is, as a rule, at least comfortable.

This is a particularly promising special field of endeavor for girls interested in eye work because there will be more and more need for girls who are capable of doing this type of muscle work. It requires patience of two kinds—first, with the child; and second, with the mother, who believes that muscle errors can be cured by snapping the fingers.

Two years ago, a program of education was started in Cleveland under the name of the Sight-Saving Plan. Lectures are given to all the Junior and Senior High School groups, the Parent Teacher Associations and any group that will listen. The lectures are presented either by a layman who gives medically supervised facts or by a medical eye man. These talks are well received and are beginning to show the value of the instruction. The youngsters are told of their responsibility to themselves in regard to their eyes and they accept this responsibility and I am sure will give more and better co-operation than ever before. It is a peculiar situation that, although the youngster of today has infinitely more knowledge than a decade ago, he is still shielded until he is through his college years. I believe we should first equip him mentally to think and then place the issue directly before him—it appears to be working in Cleveland.

Ophthalmology is a living, active branch of medicine. It moves forward slowly, carefully and with serious thought because, as you well know, eyes do not tolerate much experimenting. It is an association of the type of the National Society for Prevention of Blindness and the people connected with it that make progress. The needs of the patients, their vast number and the careful, constant check on disease are the factors necessary to stimulate investigation.

Preparing Student Nurses to Assume Responsibility for Eye Health*

Francia Baird Crocker, R.N.

AN outline of the basic principles of eye health which should be studied by the student nurse. It points out the need for variety of experience in hospital and clinic, and closer correlation between theory and care of the patient

THOUGH we see the curricula of schools of nursing becoming more social, all of us realize that present practices fall short of the objective: to understand the patient as an individual, his rôle in the treatment plan, what effect disease has upon his family and the community, and what can be done to prevent disease.

How various schools of nursing are attempting to meet the problem of preparing student nurses is of interest to us only as it applies to the field of eye health. Whenever conditions exist affecting large numbers of the population, a community problem is created and must be met. The hospital is an integral part of the community. Students of nursing are being prepared to participate directly or indirectly in health activities affecting individuals who make up the community. Are students of nursing being prepared in such a way that they are ready to assume their responsibility for eye health?

Groups Reached by the Nurse

The numerical extent of the problem of eye health can only be variously estimated. There are over 114,000 blind persons in the United States—almost equal to the population of Youngstown, Ohio. There are probably many more persons who have only

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partial sight, it is safe to estimate, although no concerted attempt has been made to secure this information on any comprehensive scale. Statistics indicate some 300,000 eye accidents a year; over half of these are serious ones—several thousand result in the outright loss of an eye. In addition to these groups there are the potential blind and those persons who have some deviation from normal, making it necessary for them to secure treatment of one kind or another. Three clinics this past year cared for a total of more than 136,000 eye patients in New York City. Almost half the population of the United States, about 50,000,000, have some eye difficulty which makes it necessary for them to wear glasses.

What Problems of Eye Health Confront the Nurse

Preliminary to considering what student nurses should learn, we should consider their eye health program.

1. Is a careful examination of the eyes made not only upon the student's admission to schools of nursing but periodically throughout the years of attendance?
2. What preparation has been made for the student to use her eyes with comfort and efficiency in her own room, the library and the classroom?
3. Are glare, insufficient light—or exposed light sources within the field of vision—still tolerated during study periods?

The education of nurses has always emphasized the necessity of making the patient comfortable. There should be no crumbs from food left in the bed; mouth wash must be provided; the back rub is recognized as essential to prevent bed sores. But how many nurses allow patients to face the direct light all day long and, in addition, permit them to look at very glossy surfaces. Although for years the new school buildings have been constructed to eliminate glare and discomfort from cross lighting, even the newest hospitals are still being built so that there is scarcely a ward without cross lighting.

In preparing students of nursing to take their share in the responsibility for eye health, attention should be focused on the following: (1) content of formal instruction—lectures; (2) practical application of instruction—closer correlation between theory and the care of the patient; and (3) sufficient variety of experience

in the hospital and clinic for gaining an appreciation of the meaning of eye health, working always toward the goal of knowing the basic principles of eye health and of preventing eye difficulties.

Content of Formal Instruction

A brief review of the text books available in ophthalmic nursing shows the tendency to emphasize anatomy and physiology, and nursing techniques of various eye diseases. While the former is necessary information, the latter will naturally always vary with the personnel of the hospital, and must be changed to conform with the practices of the various ophthalmologists. Even in the teaching of anatomy and physiology of the eye it would seem advisable to make the subject more vital.

From the point of view of practical application, the following points are more fundamental than a knowledge of the five layers of the cornea:

1. Why it is dangerous for the nurse to remove foreign bodies from the cornea.
2. Which inflammatory conditions may lead to visual impairment.
3. How may treatments, such as irrigation of the eye, be administered so as to avoid injury to the cornea.
4. When is the cornea abnormal.

If it is impossible to extend the curricula in schools of nursing to include more than five or six lectures on eyes, then eye information should be available through other courses—not incidental to, but part of, the course.

Based on courses listed in the curriculum, the teaching of eye health could be included in the following subjects:

Subject	*Emphasis on Eye Health*
Personal Hygiene	Student's own eye health.
Dietetics	Relation of diet and eye health.
Nursing in General Medical Diseases	Relation of eye health and possibility of eye difficulties associated with general medical diseases.
Emergency Nursing and First Aid Psychology	Eye injuries and removal of foreign bodies.

Subject	*Emphasis on Eye Health*
Occupational Therapy and Recreation	Emotional factors in working with eye patients.
Modern Social Movements	Organization of international, national, state, and local agencies to prevent blindness and promote eye health.
The Case Study	Discussion of glaucoma case stressing the following: (1) social significance of treatment; (2) understanding patient's responses; (3) knowing community resources for assisting patient; (4) understanding cost of illness; and (5) preventing blindness from glaucoma.

Closer Correlation Between Theory and Care of Patient

In order to bring about a closer correlation between theory and care of the patient, students of nursing must be taught individualized care of the patient in terms of health as well as disease. They must also be taught to appreciate the social significance of illness to the family and to the community; how to assist the patient in making mental and physical adjustments and planning for recreational or vocational guidance.

In one hospital having a large ward for eye patients it is considered a special privilege among the graduate nurses to be asked to work in the eye service. The supervisor is fully aware of the emotional factors involved in caring for eye patients. Some attempt is made to meet the need for recreational and vocational guidance for persons in the hospital but no effort is made to extend this service beyond the hospital.

The Seeing Eye is giving a most interesting service to blind persons. The newly blind person, instead of going to his home upon discharge from the hospital, goes to Morristown, New Jersey, for a course of training with one of the guide dogs of the Seeing Eye. When he completes this training he then goes home independent of sighted friends or relatives. This is putting into practice the theory of teaching the patient to care for himself after he leaves the hospital. Just such a carry-over of treatment should be possible, and is of great importance, in cases of serious and prolonged eye difficulties.

Varying the Student's Experiences

Often the experiences of students of nursing with eye patients are confined to a small number of patients admitted to the hospital. Unless the student's clinic service is rotated, many nurses never have the opportunity of spending any time in the eye clinic; yet many of the serious eye difficulties are treated almost entirely in the clinic. When the student does spend time in the eye clinic she is likely to be assigned the duty of keeping the trial lens case clean, keeping the instruments shiny, and assisting with an occasional minor operation performed in the clinic. The interpretation of the eye difficulty to the patient, teaching the patient to follow out the ophthalmologist's instructions, removing obstacles in the carrying out of treatment, are overlooked or turned over to the social worker, if there is one in the eye clinic. Even the patient who is eager to co-operate in the treatment plan needs help in understanding what he is supposed to do and how he is to carry out treatment at home.

Complete clinic service will be realized when each patient is taught the reasons for certain procedures in order to gain his co-operation, and when he is taught in such a way that treatment and preventive measures will be carried out regardless of his economic situation or social background.

In spite of the great numbers of people in need of eye care and knowledge regarding the prevention of eye difficulties, many students of nursing complete their course with no appreciation of eye health. If, as graduated nurses, they wish to pursue the subject further, there are, according to the report compiled by the National League of Nursing Education, only four hospitals giving courses to graduate nurses in eye, ear, nose and throat nursing.

Summary

In closing it may be well to reiterate that in preparing students of nursing to meet their responsibility for eye health we must focus attention on the following factors:

1. Content of formal instruction.
2. Closer correlation between theory and the care of the patient.
3. Sufficient variety of experience in hospital and clinic, working always to include the basic principles of eye health.

Editorials

May First—Child Health Day

ON May first, throughout the United States, parents and teachers will be celebrating May Day with the children of the nation—dedicating the day to the subject of child health. Every park will be turned over to children—for athletic contests and programs celebrating the child's growth, vigor, and safety from hazards. The radio and newspapers will observe the occasion with special features and programs.

In considering the joyousness of the occasion, may it not be well to ponder on how much the health of the eyes contributes to the general wellbeing of the child, and how many advances have been made in preventing eye tragedies to children? The color of the Maypole streamers, the rhythm of mass gymnastics, the merry faces—all are tributes to the human being's ability to see. Society is fast acknowledging that a sightless child cannot be considered an entirely healthy child. Until needless blindness is wiped out, the National Society for the Prevention of Blindness will feel it is making an important contribution toward the glorious celebration of May Day.

But it must not be forgotten that the gaiety of May Day is made possible and real only by the observation of the principles of health every day of the year. Good health can be celebrated only when all its aspects, including sight, are cared for constantly.

Elihu Root, 1845–1937

THE National Society for the Prevention of Blindness has lost its distinguished honorary president, Elihu Root. The whole prevention of blindness movement is united in the sad loss of this friend and will agree with the sentiments expressed in the following resolution passed by the executive committee of the Society:

> The death of the Honorable Elihu Root marked the passing of one of the distinguished citizens of the world. Jurist, states-

man, arbitrator, his name was brilliantly associated with movements for justice, peace, understanding. Indicative of numerous services in behalf of universal fraternity which claimed his devotion was his presidency of the Carnegie Endowment for International Peace from 1910 to 1925, and among the tributes signalizing public recognition of his activities may be cited the Nobel Peace Prize conferred upon him in 1912. Leadership in the field of jurisprudence and responsibilities in the affairs of state did not preclude an interest in organizations concerned with the health and welfare of the community, and it was a source of deep gratification to the National Society for the Prevention of Blindness when in 1930 he gallantly responded to the call to become its honorary president. His loss is recorded with great sorrow.

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request

What Public Health Nurses Should Know About Hygiene of the Eyes*

The eye is a marvelously delicate and most complex organ, able to take twelve to fourteen perfect pictures every second and to send on the complete pictures for the brain to interpret. This requires precision and a perfectly working organism. It has been said that 90 per cent of our knowledge of the outside world comes to us through our eyes.

Health is that state in which all the natural functions are performed freely without pain or disease. Eye health must then mean these functions performed naturally without pain or disease.

This paper does not deal with vision, or the prevention of poor vision, alone, but with all the conditions of eyes which lessen the acceptability of a particular person to society.

Prenatal and Congenital Infections Causing Blindness

The range of interest in eyes of the public health nurse begins with the care of the child before it is born. The condition of the mother's health from every angle is her concern. She must know how to get the expectant mother to a reliable physician for a complete physical examination and how to secure treatment or correction of defects when found. Prenatal and congenital infections in relation to blindness and impaired vision, such as infections from gonorrhea and syphilis, should be first-hand knowledge of the public health nurse, and, in co-operation with the attending physician, this knowledge should be imparted to the expectant

* Presented at the Annual Conference of the National Society for the Prevention of Blindness, Columbus, Ohio, December 4, 1936.

mother. If an infection exists, how to secure treatment and how to secure the co-operation of the parents of the expected child are no small functions of her duty. The reason why many infected patients are not treated is not only a question of economics but often of ignorance of the great harm that may be done to the newborn child.

Ophthalmia neonatorum, of which 75 per cent is due to gonorrhea—the cause of much visual deterioration from corneal scarring in children not blinded—and interstitial keratitis—the most evident of the congenital or prenatal infections due to syphilis—are the two diseases for which immediate treatment is necessary.

The nutrition of the mother is important. Certain forms of keratitis in early childhood may be due to the poor general health of the child. The health of the eyes is dependent in a large measure upon the health of the body. Nervous disorders, focal infections, tuberculosis, acute infectious diseases, disorders of metabolism, may be the causes of eye difficulties.

Focal Infections and Deficiency Diseases

Focal infections are a prolific cause of eye disease. In such cases a localized area of disease, occurring in remote parts of the body, gives rise to certain eye conditions which may terminate in blindness. The most frequent sites for these focal infections are the teeth, tonsils, nasal sinuses, intestinal tract, and the genito-urinary organs.

Certain eye defects may accompany deficiency diseases. We know that a deficiency of vitamin A causes night blindness, and there is a theory that cataract formation is related to a lack of vitamin G. This has been proved by experimentation with animals.

There also is a theory that shyness in children is often due to impaired vision. We know of a child who stuttered at the age of 22 months and was very shy. At the age of four years she had a complete eye examination and was found to have very poor vision. After being properly fitted with glasses, the stuttering disappeared. She was less shy and her behavior was improved. Later she broke her glasses and was without them for about four days. The stuttering reappeared, but after she was again fitted with her glasses, it disappeared.

Importance of Eye Care in Early Childhood

Early childhood is the time to detect and correct visual disabilities. At work or play an intelligent parent or a teacher can detect impaired vision in a child. Farsightedness is a normal phase of the early growth and development of the eye. Unless there are signs of strain or an evidence of cross-eyes in children of nursery school age, farsightedness is to be looked upon not as a defect but as a normal characteristic

to be taken into consideration in planning the children's work or play activities.

We must remember that the eyes of the young child, like the rest of the body, are in a stage of growth. Too close work should not be required of him.

The eyes of young children are much more susceptible to infection than are the eyes of older children or adults. Cleanliness and proper facilities for the washing of the face and hands are public health measures used in prevention of infections. It is not enough to teach the parents and the child the importance of cleanliness only, but it is necessary to teach the proper facilities used in performing these functions. Schoolroom equipment for cleanliness is as necessary as home equipment. It is often the duty of the nurse and teacher to interest the school authorities in providing this equipment.

Correct Lighting and Equipment at School and at Home

Proper lighting of homes and schoolrooms is very important in eye health. Illumination should not be judged by the brightness of the lamps, but by the amount of light at the place where it is needed. The trial and error method of lighting classrooms in schools should no longer be tolerated. Not only recognition, or discovery and correction of visual defects among children, but also the prevention of visual defects, should interest the public health nurse. She, therefore, must be informed about the lighting of rooms, the sun or lamp glare, the position of students at their desks, etc.

Two buff-colored window shades of durable, woven, translucent material, on rollers fastened at the middle of the window, furnish a satisfactory means for the control of the light. One may use a buff curtain of translucent material if shades cannot be purchased; even brown wrapping paper could be used in emergencies.

Tables and chairs should be adjusted to lights, and children should be free to move their desks about so that they may avoid facing a bright light.

Not only is the light as it falls on the book important, but the right kind of printing is needed. Publishers should print books so that the print is clear and easily read, for children use their eyes on books or blackboards constantly for a great number of years.

The guiding of parents in an understanding of the eye health needs of children is an important function of the teacher and the school nurse.

The intelligent choice of toys is essential if accidents are to be prevented in childhood. Toy guns, firecrackers, sharp-cornered blocks or sharp-pointed objects, such as knives, scissors, hooks and sticks, have no place in the play equipment of young children.

Protecting the Eye in Industry

In industry, we have a similar picture to that of the home and classroom. Correct lighting is exceedingly important for the protection of workers when the eyes are used for close work or where attention is given to one object for any length of time. Eye fatigue may be due to insufficient light, too much light or glare, flickering light, or too long-neglected eye conditions requiring refractive or other corrective measures.

Short periods of rest should interrupt all kinds of close work, during which time the eyes should be directed on distant objects.

Accident hazards are, of course, the most serious of all industrial hazards. A great many mandatory rules for the protection of workers have been made in industries. The rules are useless unless they can be enforced or there is all-year-round educational activity.

It appears from statistics that the actual cost of eye injuries in industry is in the neighborhood of $50,000,000 a year. The employers, employees and the community are interested, even if from entirely different points of view. The community becomes interested when the employee becomes a ward of society, as often happens. Rehabilitation of those with visual handicaps is the most difficult. An arm or a leg, if lost, may be replaced by an artificial limb, but the sight of an eye, if destroyed, is irreplaceable. You cannot see through an artificial eye. Hygienic conditions are as necessary here as in the schoolroom or home. Restrooms, lockers, baths and toilets, as well as places for the storage of food and clothes away from fumes and smoke, and proper washing facilities, are needed.

The common house fly is a source of infection and has been known to cause epidemics of eye trouble.

A complete examination of the eyes may easily be the most important part of a physical examination. It not only demonstrates the individual's ability to see but may reveal conditions of the general health which are overlooked in an ordinary physical examination. For instance, unsuspected kidney disease, diabetes, brain tumor, syphilis and tuberculosis are often detected by the ophthalmologist without the aid of a general physical examination.

Rôle of the Public Health Nurse in Care of the Eye

Public health nurses, visiting as they do from several hundred to several thousand homes every day, are invited into those homes very often because there is some actual personal service to give. They have an exceptional opportunity to interpret eye health in an easy, natural way to the mothers in the homes, to the fathers and to the growing children.

All public health nurses have general information. Some of it is

specific, much of it is oftentimes vague. A nurse cannot teach that of which she is not thoroughly aware. Since the public health nurse sees the family as a whole, which means the environment and all that pertains to the living of the family, she must be familiar with everything that affects the health of the human being.

The health worker of today is fortunate in that she can secure reliable information from books and pamphlets, from national, federal and state agencies, that will guide her in the giving of advice to parents and teachers regarding health and the prevention of blindness.

S. Gertrude Bush, R.N.
Columbus, Ohio

What Is Wrong With Our Fifty Foot-Candle Installations?*

There has been much discussion during the past two or three years about higher levels of illumination —20, 50, and 100 foot-candles for stores, offices, and schoolrooms. Many of you feel your major difficulty lies in your ability to sell such installations. My own belief is that the major task is to know how to supply comfortable lighting at these levels after you have convinced the customer of its desirability. All of you have made installations of general lighting at these high levels; probably in most instances you have been able to persuade yourself that they are tolerable. In the case of an office, for example, you use the well-worn argument that a person's gaze should be directed down toward his work rather than up toward the ceiling. However, the fact that you have had to persuade yourself and your client that the results are all right is in itself an indictment of the lighting system. The right kind of an installation would not have suggested the possibility of discomfort.

Visibility and comfort are two separate factors which do not always overlap completely. One cannot conceive of high comfort where the visibility is low for the task at hand; however, the converse is not necessarily true. There may be a definite lack of comfort in installations where the visibility itself is high, and this lack is usually obvious, whereas the lack of comfort resulting from insufficient foot-candles and consequent low visibility may be more subtle. The paper by Luckiesh and Moss, entitled "Quality of Lighting," in the 1935 Illuminating Engineering Society *Transactions*, dealt largely with the visibility aspect, although somewhat with comfort. This paper is limited to a consideration of a type of discomfort which is noticeable almost immediately.

* A paper presented at the 30th Annual Convention of the Illuminating Engineering Society, Buffalo, N. Y., August 31 to September 3, 1936, and reprinted, with permission, from *The Magazine of Light*, October, 1936.

Please note also that I refer to results secured from strictly general lighting systems. Both general lighting and general lighting plus supplementary lighting have advantages and disadvantages peculiar to themselves. The difficulty from the standpoint of comfort of which I speak now is one peculiar to general lighting systems.

What, then, is the difficulty with these 50 foot-candle general lighting installations? It is usually a question of brightness, and unquestionably something is usually too bright—perhaps the luminaires, perhaps the ceiling and walls of the room, or perhaps some reflection from the principal surfaces illuminated. The chief trouble is that the methods and luminaires that we have employed with entire satisfaction for 5 and 10 foot-candle installations somehow become very cantankerous when we build the level up to 20 or 50 foot-candles. Perhaps something is lacking in our knowledge of the fundamentals of the science with which we have to deal.

The truth is that few of us have given real hard, serious thought to the subject of brightness. Let me illustrate by means of a question that I have been asked frequently: "Why isn't it all right to put a 200-watt lamp in an enclosing globe designed for 100 watts? The brightness goes up two to one, but so does the illumination, and everything should be satisfactory." But should it? On our way to answer that question let us first briefly compare moonlight and sunlight. The moon is 2159 miles in diameter and 238,000 miles away. The sun is 853,000 miles in diameter and about 92,000,000 miles away. In other words, the sun is almost exactly 400 times as large as the moon and almost exactly 400 times as far away. The two bodies look to be of the same size as we view them in the sky. The only difference is that the sun is brighter and the illumination it produces is higher in the same proportion.* Shouldn't the sun be just as easy to look at as the moon? Perhaps it would be if our eyes were just camera eyes instead of human eyes, but they are not, and while it is comfortable, even intriguing, to look at the moon, only an eagle is reputed to gaze upon the sun. Don't be misled into regarding the moon as a weak light source. It isn't. It gives something like 35,000,000,000,000,000 candle-power. Furthermore, its brightness is about 1500 foot-lamberts, whereas that of the earth as illuminated by it is not more than 0.01 foot-lambert, a ratio of 150,000:1. Still the results are not at all uncomfortable.

Suppose we were to try to bring moonlight into an office. We would have a light source of 1500 foot-lamberts brightness (about three candlepower per square inch) and

* In the ratio of about 400,000:1.

two-thirds of an inch in diameter. A source just about the size of a candle flame and of its brightness would fairly well represent the moon if hung seven or eight feet above the desk tops in an office. A candle flame is not glaring under such circumstances, and measurements will show that brightness contrasts are of the order of 150,000:1 (the same ratio as in actual moonlight). What, then, is all this we hear about holding contrasts down to 10:1 to insure comfort? That is where the eye is entirely different from a camera; it becomes infinitely more particular about brightnesses and contrast as illumination goes up, and exceedingly so at sunlight levels.

You have noticed that I am using a conversational style in approaching this subject of brightness; it is by intent, and I desire to continue in this vein because the figures I will use and the ratios I will cite are, for the most part, far from mathematically precise. I do not want you to draw too fine-spun deductions from them. In fact, one of the reasons for writing this paper is to encourage others to conduct more thoroughgoing investigations yielding more exact quantitative results in this field.

You will note, also, that in all cases I have expressed brightness in terms of "foot-lamberts"—the brightness of a diffuse surface reflecting or emitting one lumen per square foot. It is very desirable to get used to thinking in the same terms when we deal with the brightness of light sources and the brightness of the surfaces which they illuminate. In the past we have used candlepower per square inch frequently when dealing with light sources, but this kind of term becomes cumbersome when applied to the brightness of illuminated surfaces. Foot-lamberts, or milli-lamberts, cover both very acceptably. As long as we use the term foot-candle rather than lux in this country, we should also use foot-lambert rather than milli-lambert, although the two units are within 8 per cent of being the same quantitatively.

I now wish to make two very simple visual demonstrations which will illustrate the two main points of this paper:

1. The first shows that a 1500-lumen (100-watt) lamp in a six-inch globe (28 square inches projected or apparent area) is distinctly more comfortable to look at than a 6000-lumen lamp in a twelve-inch globe (112 square inches projected area), although the intrinsic brightness of the two is the same. If we try a 4000-lumen lamp, you will probably agree that it is just about as hard to look at in the twelve-inch globe as the 1500-lumen lamp is in the six-inch globe. It is not sufficient to increase the area of a globe directly with the lamp lumens, but for equal comfort the diameter of the globe must be increased almost as fast as the light output of the source. Consequently the globe area will in-

crease nearly with the square of the lamp lumens.* How different this rule is from our ordinary commercial practice where for a 5500-lumen (300-watt) lamp we recommend a globe only 60 per cent larger in diameter than for a 1500-lumen (100-watt) lamp. Actually, it should be three or four times as large.

2. The second demonstration is to a certain extent tied in with the first. It shows that if you have two backgrounds, one illuminated to one foot-lambert and the other to ten foot-lamberts, and two light sources are placed in front of these backgrounds, it is not satisfactory to have one of these light sources ten times as bright as the other; in fact, the source in front of the ten foot-lambert background must not be much more than twice as bright as the other.†

These facts are not new. Twenty years ago Dr. P. G. Nutting presented a paper before this Society in which he showed that if a source of 1700 foot-lamberts brightness was comfortable in surroundings of one foot-lambert brightness, then when the brightness of the surroundings was increased from one foot-lambert to ten, the permissible brightness of the light source could not be increased from 1700 to 17,000 foot-lamberts, but only from 1700 to 3400 foot-lamberts, assuming that the source was to remain correspondingly comfortable in those surroundings. This indicates that we can tolerate a contrast of 1700:1 when the brightness of the surroundings is one foot-lambert, and a contrast of only 340:1 when the base is only ten foot-lamberts brightness.

He found further that a contrast of about 45:1 is the limit for comfort where the surroundings have a brightness of 200 foot-lamberts. If the curve were extrapolated a little further, you would soon come to a point where a contrast of not more than 1:1 was indicated (Fig. 1). This indicates a condition where the eye simply cannot tolerate any increase in brightness under any circumstances, regardless of the surroundings. This would correspond to a brightness of about 50,000 foot-lamberts; that is, about five times the brightness of sunshine on a white surface.

Let us try to apply the conclusions gathered from these two demonstrations to a practical problem. Suppose we have a schoolroom illuminated to two foot-

* A preliminary investigation in 1919 by Ward Harrison and E. W. Commery and several observers indicated that the diameter of a source should increase at least as fast as the light output. *Transactions*, Illuminating Engineering Society, Vol. XV, Feb., 1920, page 34.

Data by L. L. Holladay, *Journal of the Optical Society of America*, April, 1926, page 306, indicated that the necessary increase in size of source is a geometric mean between increasing its diameter in proportion to the light output and increasing its area in that proportion. In other words, his data show that the diameter need not increase as fast as the light output, but that the area must increase faster.

† *Transactions*, Illuminating Engineering Society, Vol. XI, Dec., 1916, page 943. Dr. Nutting's results were checked by Mr. Holladay's data, *Journal of the Optical Society of America*, April, 1926.

candles (average in service) obtained from four 1500-lumen (100-watt) lamps in ten-inch enclosing globes nine feet above the floor—not a particularly desirable way to illuminate a schoolroom, but let us assume that the luminaires are just inside the limit of what is comfortable, but nevertheless definitely within that limit. If we want to increase the illumination to twenty foot-candles, we have to use 15,000-lumen (750-watt) lamps in each outlet and, according to demonstration 1, our globe diameter should increase between five and ten times; that is, to somewhere between 50 and 100 inches, to be as comfortable as the 1500-lumen lamps in ten-inch globes. It is true that this diameter might be shaved down somewhat due to the higher brightness level of the twenty foot-candle room,* but this is of academic interest only, since we have neither one hundred-inch globes nor forty-inch globes. Our figures indicate that we cannot use direct lighting from ordinary enclosing globes in this schoolroom if we wish conditions to be comfortable. The only way to obtain such diameters of light source is to utilize the ceiling above each unit; in other words, to install some form of indirect lighting. My general observation has been that indirect lighting furnishes a very satisfactory means of solving the problems requiring twenty foot-candles of general illumination.

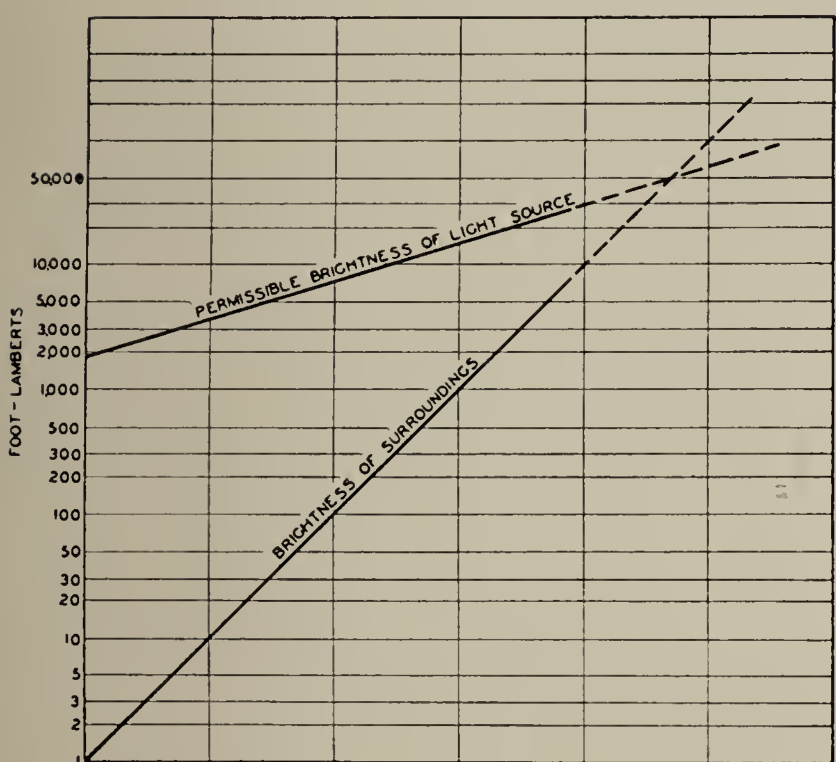

Figure 1.—The relation between permissible brightness of light source and brightness of surroundings.

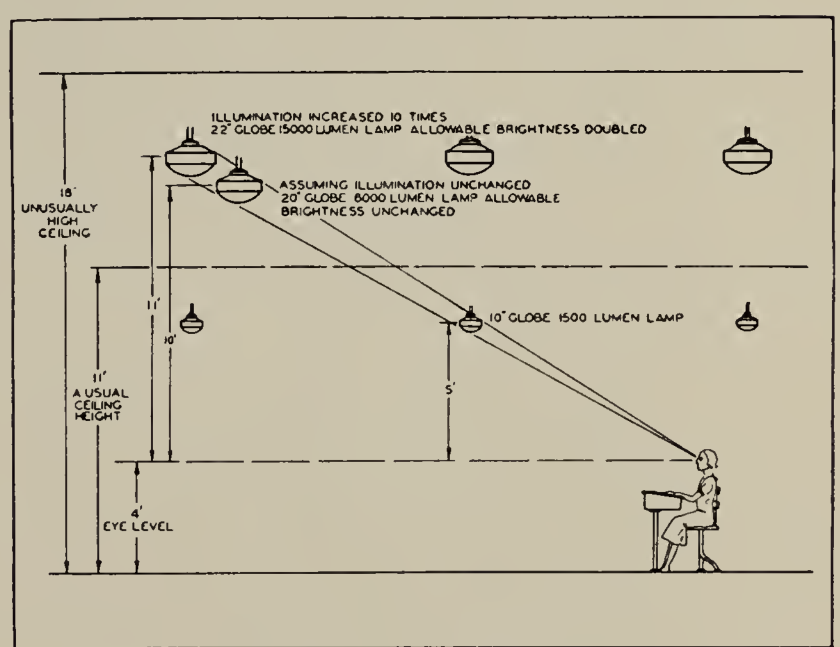

Figure 2.—The relation between mounting height and permissible brightness of light source.

* Demonstration 2 shows that this increase in the brightness of surroundings of 10:1 permits of doubling the light source brightness; hence the globe area may be reduced by one-half, which means that the diameter is reduced 30 per cent.

But suppose we want 200 foot-candles. Under these circumstances our diameter of light source would have to be from five to ten times that which is required for twenty foot-candles. This would require a ceiling area twenty feet, or possibly forty feet, in diameter, evenly illuminated above each of the lamps in the room. There is no such area available on the ceiling and the conclusion which must be drawn is that 200 foot-candles is beyond the limit of comfort for indirect lighting, for the ceiling, if within the field of view, will become offensively bright. As a practical matter, we seem to be at about the limit for indirect lighting at forty or possibly fifty foot-candles in a room of usual dimensions.

Where the ceilings are unusually high, our problem is very much simpler. If the height of the luminaires above the eye level can be doubled, they will appear to be only half the diameter. With a fixed level of illumination it is permissible under these circumstances for a twenty-inch globe to have just as great a brightness as a ten-inch globe at half the height (Fig. 2). This means that in the schoolroom considered it would be possible to put 6000 lumens in a twenty-inch globe if the units were hung ten feet above the eye level (fourteen feet above the floor) instead of five feet above the eye level (nine feet above the floor). And taking into account the increased level of illumination, the 6000-lumen lamps could just about be used in sixteen-inch globes mounted twelve feet above the floor. In twenty-two-inch globes, the 15,000-lumen (750-watt) lamps required to produce twenty foot-candles would give a comparably comfortable result if suspended at a height of fifteen feet above the floor (eleven feet above the eye level); in other words, in a room with a ceiling height of about eighteen feet. It may also be deduced that in this eighteen-foot room at least 100 foot-candles could be obtained without undue brightness if indirect lighting were used.

Many of you have observed installations in high-ceilinged rooms where the luminaires were not in themselves of a particularly high degree of excellence, and yet where the illumination effect seemed very soft and satisfactory. The pleasing result was probably due, more than anything else, to the high mounting of the light sources. Even bare frosted lamps may be acceptable under such circumstances, as in the case of the auditorium of the Port of New York Authority Building.

Our main problem, however, is with offices, schoolrooms, and stores having ceiling heights seldom above twelve feet, and often less. It appears that it is not possible to produce fifty foot-candles and upwards in such interiors unless the principal light source, whether it be an enclosing globe or an area of ceiling, is shielded from the ordinary field of view. It is not hard

to do this in the case of an area like a show-window or a theatre where everyone views the display from one direction. The same result can in a measure be accomplished in an office or a schoolroom by placing shades or shields around the luminaires. Under these circumstances, however, if the globe brightnesses are high, both shadows and reflected glare may prove annoying, particularly in an office. In some instances a somewhat similar principle, open to the same objections, has been followed by recessing the light sources in the ceiling and louvering them. Another method is to design the room with deep beams across the ceiling and have indirect lighting units so placed that their light is concentrated on the ceiling between the beams rather than on the beams themselves. A coffered ceiling with units of reasonable brightness—for instance, artificial skylights three feet square in the top of each coffer—is a very good equivalent of the ceiling beam idea. Another possible solution of this problem is one we have been experimenting with in my own office, where the areas of ceiling which receive light from the indirect units have the cross-section of a parabola. Under these circumstances the principal light directed toward the working surfaces comes from directly above, and distant portions of the ceiling appear to have a very low brightness entirely tolerable to the eye.

In conclusion, I would like to leave with you the following rather general statements of three fundamentals of illumination design that affect the comfort of a general lighting system. As I have said before, the figures used are not precise, but I think they represent about the right order of magnitude:

1. When the light output of a visible source is increased ten times, its brightness should be decreased to not more than one-half, or perhaps even to one-fifth, of its former value; in other words, the light output of a source cannot be increased as fast as its area, but it is safe to increase the output as fast as the diameter.

2. Increasing the general level of lighting in a room ten times permits only of doubling the brightness of the light source.

3. Doubling the mounting height of a unit permits of increasing approximately three times the lumen output of the lamp which may be used in that unit.

These three conclusions taken together may make it clearer as to why we can look comfortably at the moon by night, but not at the sun by day; why a room is sometimes rendered more comfortable with half of the window area covered by drawing the shades; and finally, why we cannot handle 50–100 foot-candle installations by our five- and ten-foot-candle methods and reasonably expect to achieve success.

Ward Harrison
Cleveland, Ohio

Note and Comment

Announcement of Summer Courses for Training Sight-Saving Class Teachers.—Four colleges and universities are offering summer courses for the training of teachers and supervisors, as well as for all teachers interested in conserving the sight of their students.

The elementary course to be given at Western Reserve University, Cleveland, Ohio, begins June 21 and extends through July 30, 1937; registration, June 21. At Wayne University, Detroit, Mich., it will be given from June 28 through August 6; registration, the week prior to June 28. The course at Teachers College, Columbia University, New York, N. Y., extends from July 12 through August 20, with registration July 8, 9 or 10.

The advanced course at Western Reserve University begins June 28 and extends through the month of July; reservations may be made by mail and must be in the hands of the registrar before June 5. At Teachers College, the advanced course occurs simultaneously with the elementary course, July 12 through August 20, with registration July 8, 9 or 10.

Further information regarding the courses, including details of housing and tuition, may be obtained from the universities or colleges.

General Institute on Eye Hygiene, May 3–28.—The National Society for the Prevention of Blindness is holding an Institute in its offices at 50 West 50th Street, New York City, for public health workers and social workers. The committee on arrangements consists of Conrad Berens, M.D., Miss Jeanne Wertheimer and Mrs. Francia Baird Crocker, R.N. Willis Knighton, M.D., will be the ophthalmologist in charge of the lecture course. Lectures, discussions and demonstrations will be given by ophthalmologists, public health officers, social workers and staff members of the Society. Complete programs are available upon request.

There is no tuition fee. Applications may be made to the Society. Persons who are unable to attend all the lectures but who wish to take advantage of special ones should indicate the

date and lecture in making inquiry. A list of inexpensive places to live will be sent upon request.

Annual Report of the Illinois Society for Prevention of Blindness.—No one reading the annual report of the executive secretary of the Illinois Society for Prevention of Blindness could fail to grasp the energetic and stimulating drive of that organization in stamping out blindness and saving sight in its state. On a limited budget, the Illinois Society seems to have covered a tremendous volume of service, from reduction of ophthalmia neonatorum to stamping out trachoma. In the past year, 7 new sight-saving classes were opened in the state of Illinois—a tribute to the untiring efforts of this Society. Its program is an excellent example of what can be done in combining case work with public education in a local program of sight conservation.

Safe Drivers.—The value of testing the individual motorist is brought out in a recent article by Dr. Harry De Silva of the Harvard University Bureau for Street Traffic Research, in which he describes the testing apparatus used at this year's automobile show. The importance of good eyesight is shown in the inclusion of tests for vision for night driving, ability to recognize traffic lights, color blindness, tunnel vision and eye-hand co-ordination necessary to steer a car over a shifting road for a period of one minute. Since the rapid increase of night accidents over day accidents has been thought to be most commonly due to the menace of glaring headlights, a test was also given to measure sensitivity of the individual to glare and its effect on driving.

California is now using the instruments which Dr. De Silva has developed and which test sensory and muscular reaction time, eye keenness, judgment of depth, width of vision, muscular imbalance and astigmatism of eyes, judgment of speed and co-ordination of hand and eye. Persons tested are those who have had fatal accidents, multiple nonfatal collisions, habitual violators of traffic laws, and good drivers, who, because of their fine records over a great number of years, have been invited to come in and be tested in order that their tests may be compared with those of drivers whose records are bad. The chief of the division of drivers' licenses of

California says: "Quite frankly, we are experimenting, but from these machines we expect to develop examinations and information that will enable the division of drivers' licenses to play a prominent part in the work of reducing traffic accidents and fatalities."

Many dangers have been discussed and demonstrated recently in connection with safe driving, and there are undoubtedly many factors which contribute to the unnecessarily heavy toll of death or injury because of accidents. No one—after a little serious consideration of the results of poor eyesight on the road—can deny that eye examinations should be a vital part of the driver's test in every state in the Union. Even though a person's eyes are normal when he is tested for a license, he may later develop a serious eye disease, lose an eye or have good sight but a minor defect, such as a restricted field of vision, which makes it impossible for him to see anything approaching from the sides or from hills; and yet the driver's license, once issued, is automatically renewed each year without any further attention being paid to his health, and particularly to his eyes.

New Magazine.—One of the initial activities of the recently established Office of Public Health Education by the United States Public Health Service has been the publication of a bulletin of current health information entitled *The Health Officer.* This monthly digest for officers of the service, health officials throughout the country, and those of the laity who are interested, reports current happenings in all branches of community health and of science concerned with public welfare. Abstracts from current literature and reviews of significant books are presented. The magazine, although mimeographed, is attractively bound and, judged by the first few issues, promises to be a helpful addition to the literature in the public health field.

A School Program for Saving Sight.—In York, Pennsylvania, the public schools provided facilities for having the children's eyes tested and the amount of light under which they work measured as a part of a sight conservation program. In addition, sight-saving equipment has been installed in 62 classrooms. The results of the tests made, as well as excerpts from current literature on

sight saving, are published in "A Local Study Bulletin or Reference Manual," which has been placed on permanent file for the teachers' reference. Enclosed in the report are sample copies of the mimeographed letter to each teacher and the forms on which she was requested to report her sight-meter tests.

Prevention of Blindness in Hawaii.—The program of conserving sight in Hawaii during the past year included preschool and public school vision testing, and the establishment of sight-saving classes. It was carried out by the director of conservation of sight and work for the blind in Hawaii, in co-operation with the Territorial Medical Association, the Board of Health, Department of Education and various private and service organizations, such as the American Red Cross and the Adult Blind Association. A comprehensive report for the year ending June 30, 1936, describes the work in full.

Massachusetts Protects Eyes.—The number of industrial eye injuries in Massachusetts was more than cut in half between 1919 and 1935. How this excellent record has been accomplished is contained in the following extracts from the report of the division of industrial safety for the year ending November 30, 1935:

"The provisions of law to protect the eyesight of employees occupied a prominent place in the work accomplished through inspection of industrial establishments. When the nature of the work or the machinery used suggested danger of injury to the eyes of employees, mechanical devices were required for their protection. Suitable goggles and transparent shields were among the means required for this purpose.

"The industrial bulletin issued by the department and containing suggestions to employers and employees for the prevention of eye accidents was circulated among employees working in trades where eye injuries were numerous. The importance of taking care of the eyes was stressed in this publication.

"During the year 242 orders were issued requiring compliance with the provisions of the lighting code and these have been complied with. The inspection work required in this connection protected employees from glare and provided better distribution of light. Improvements were made in the proper shading of lamps which increased the intensity of illumination in the work place and made lighting adequate at the entrance to and exit from the

establishment. The accumulation of dust and dirt on lamps in some cases was found to impair the efficiency of the lighting system and regular cleaning of the equipment was urged. In many cases it was necessary to change the locality of the lighting source, especially where polished surfaces caused eye fatigue and interference with vision. To maintain adequate light in the workroom, tests were made of the lighting volume and advice given with regard to the height and location of lamps and the use of shades for reflectors. In the basements of mercantile establishments which are used largely for storage purposes, sufficient lighting facilities are necessary to prevent injuries to employees by stumbling over obstructions in passageways. These places were inspected with other parts of the establishment and careful attention given to the distribution of sufficient light in these work places."

Eye Health to Receive Special Study.—"Public Health Nursing in Expanding Statewide Health Programs" is the theme of the continuation study program offered this year by the New York State Department of Health to public health nurses throughout the state. About 1,600 nurses enroll annually in this staff education project. The health programs that are to receive special study this year are maternal and child health, orthopedics, syphilis control, eye health, and cancer control. At a series of one-day institutes, to be held in 15 convenient centers in the State, the director of each of these programs, with a staff of assistants, will outline existing needs, plans for increased effort, and the newest aid and information for participating in the respective activities.

New Eye Service in England.—A national campaign to educate the British public in the care of the eyes has been undertaken by the National Ophthalmic Treatment Board in conjunction with the British Medical Association, which will be carried out by means of booklets, lectures, and motion pictures. Particular attention will be paid to children and, where possible, further national eye service centers will be opened to provide treatment, at a nominal cost, by qualified eye doctors.

Saving Sight in India.—Sixteen lectures on the prevention of blindness were delivered in Bombay under Junior Red Cross auspices in all the main cities of the Presidency. These lectures were

given by various doctors to municipal school teachers, scoutmasters, in Social Service League training centers and in schools. In the report on the course it is stated that the lectures have been more than worth the money and effort expended on them, and that similar projects will be of great educational value, the results of this type of propaganda being more far reaching than any other kind. The lectures were attended by over 2,000 persons, many groups asking for further lectures and expressing willingness to pay for them. It is hoped that other branches will also undertake this method of fighting blindness among people, many of whom suffer equally from ignorance of the proper methods of overcoming eye diseases, from carelessness, and from lack of eye hygiene.

National Society Notes.—In connection with sight-saving classes, as well as with other aspects of the Society's co-operative program for conservation of vision, Mrs. Winifred Hathaway, associate director, has conferred with key people of the National Education Association, New Orleans, La.; New York University, New York, N. Y.; the boards of education of Detroit, Mich., and Cleveland, Ohio; and the International Council for Exceptional Children, Cincinnati, Ohio. On a state tour arranged in co-operation with the Louisiana Society for Prevention of Blindness, Mrs. Hathaway lectured before various educational, social service and civic groups throughout the state of Louisiana. She has also lectured before a group of school principals regarding eye health in public schools, under the auspices of the Eyesight Conservation Committee of the Brooklyn Health Council; before a group of students from Brooklyn College; and before an audience of public health nurses in Wilkes-Barre, Pa., under the auspices of the Pennsylvania Association for the Blind.

In addition to general staff conferences with a government representative, regarding promotion of sight conservation by the federal government, Lewis H. Carris, managing director, and Mrs. Eleanor Brown Merrill, associate director, conferred with members of the Social Security Board and the United States Public Health Service in Washington, D. C.

Upon the invitation of the Eyesight Conservation Committee of the Brooklyn Health Council, Mrs. Merrill presented the subject

of prevention of blindness to the lunch club conducted by the *Brooklyn Daily Eagle*. This was also the subject of her talk before a student group of the Church Army who are considering eye health in relation to their future work.

The Society's associate in education, Dr. Anette M. Phelan, is on an extensive field trip, participating in programs for integrating eye health in college training in various teacher training centers. In addition to an address given at Vassar College, Dr. Phelan recently attended the conference of the National Education Association in New Orleans and took part in a meeting of the advisory committee on teacher education in eye health.

Mrs. Francia Baird Crocker, R.N., associate for nursing activities, addressed the nursing staff of the board of education in Newark, N. J., and also gave a talk at Teachers College, Columbia University.

The 1936 annual report of the Society, recently published under the title of "Let's See!" describes the various projects of the Society and lists the following accomplishments: 350,000 copies of publications were distributed; the film, "Preventing Blindness and Saving Sight," was shown to 90,000 people; press releases of the Society resulted in 2,445 news articles and editorials in magazines and daily newspapers throughout the country; conventions and county fairs used 121 mounted displays and exhibit sets provided by the Society; staff members of the Society visited 88 cities in 27 states; and 10 radio talks, made by staff members, brought many requests for guidance on eye health problems.

Book Reviews

DISEASES OF THE EYE. Sir John Herbert Parsons, C.B.E., D.Sc., F.R.C.S., F.R.S. New York: The Macmillan Co., Eighth Edition, 1936, 705 p. ill.

This volume, approaching as it does the ideal text for the medical student in ophthalmology, has an even broader usefulness in that it is detailed enough to be used for quick reference when general practice is begun. Any book which reaches an eighth edition, as has this one, has proved its worth.

The reviewer feels it is more satisfactory than certain other books of its class because it outlines the basic features of ocular anatomy and physiology in a very satisfactory way.

The sections dealing with various phases of fundus study are so well illustrated in colors as to be a veritable atlas. Other portions of the book are also well illustrated. The material is very well arranged and presented in a clear, yet concise, diction.

JOHN N. EVANS, M.D.

VOORKOMING VAN BLINDHEID. Prof. J. Van der Hoeve. Leiden: H. E. Stenfert Kroese's Uitgevers-Mij N. V., 1937, 53 p.

Prevention of blindness was the subject of this address, delivered by the Rector Magnificus of the University of Leiden on the 262d anniversary of the founding of the University by the Prince of Orange. It is especially interesting as being a comprehensive survey of preventive measures given by one of the leading ophthalmologists of the world who is, at the same time, a distinguished representative of Dutch medicine and scholarship. It indicates how deep an interest has been developed and how widely it has extended for the prevention of blindness.

Professor Van der Hoeve considers blindness from various aspects, its importance as a social problem and as related to deafness. A definition is given as to what constitutes blindness and something as to the number of blind in the world. He describes the formation of the International Association for Prevention of Blindness and the International Organization Against Trachoma at the

meeting of the International Ophthalmological Congress at Scheveningen in 1929. He discusses congenital blindness; blindness of factory workers; loss of sight from diphtheria and the great decrease under proper measures; and trachoma as manifested in China, Egypt, Palestine and elsewhere. He refers to the work on trachoma, of Jitta, of the League of Nations, as well as that of Professor von Grosz. Professor von Grosz was for five years President of the International Organization Against Trachoma, whose present head is MacCallan, world renowned for his trachoma work in Egypt.

The author refers to the use of optochine as a specific in the pneumococcus of ulcus serpens; he discusses fully diabetes in its effect on the eye and the use of insulin, and refers to the work of Joslyn in this connection. He speaks of xerosis conjunctivae and avitaminosis in keratomalacia, operative work on cataract and cataract caused by naphthalene, and mentions especially the experimental work on swine at the Texas Agricultural Station in which the absence of vitamin A produced blind pigs with anophthalmus. He discusses glaucoma and other forms of preventable blindness. He mentions the moot question of sterilization in the congenitally blind. It is an especially valuable work.

This is a very cursory review of an admirable address which indicates how rapidly the prevention of blindness movement is extending throughout the world.

Park Lewis, M.D.

Ophthalmology in General Practice. O. Gayer Morgan, M.A., F.R.C.S. London: John Bale, Sons & Danielsson, Ltd., 1935, 58 p. ill.

This is a monograph of 58 pages. It is apparently intended to give the general practitioner some idea of the field of ophthalmology and includes an abbreviated description of external diseases, fundus conditions, glaucoma, squint and errors of refraction. Four pages are devoted to the foreword and a description of the instruments required, whereas the subject of squint is dismissed in three pages. Most attention is paid to external diseases and injuries. There are eight black and white plates portraying various internal and external conditions.

It is this reviewer's opinion that books of this sort, with their necessarily meager information, often thwart the purpose of the writer. It is assumed that the author intends to awaken an interest in ophthalmology and to provide a stimulus to further study. Too often, however, the general practitioner is content with "pocket information." The book tries to cover too big a subject in too few pages.

WILLIS S. KNIGHTON, M.D.

Books Received

CARDWELL, M.D., MARY G.: *Some Aspects of Child Hygiene.* 82 p. ill. Sir Isaac Pitman & Sons, Ltd.

HALSTEAD, WARD: *The Effects of Cerebellar Lesions upon the Habituation of Post-Rotational Nystagmus.* 130 p. ill. The Johns Hopkins Press.

LAYMAN, JOHN D.: *The Avian Visual System.* 36 p. ill. The Johns Hopkins Press.

RICH, MARGARET E.: *Current Trends in Social Adjustment Through Individualized Treatment.* 18 p. Family Welfare Association of America.

TURNER, M. A., C. E., and COLLINS, GEORGIE B.: *Community Health* (Revised). 250 p. ill. D. C. Heath and Co.

TURNER, M. A., C. E., and HALLOCK, GRACE T.: *The Voyage of Growing Up* (Revised). 204 p. ill. D. C. Heath and Co.

Current Publications on Sight Conservation

Note.—The National Society for the Prevention of Blindness presents the most recent additions to its stock of publications. Except for the more expensive ones, single copies are sent free upon request. Unless otherwise specified, they are reprinted from The Sight-Saving Review. New publications will be announced quarterly.

227. **The Conquest of Blindness.** Flyer on syphilis and sight, urging the reader to join the crusade to help fight syphilis, which is curable.

228. **Some Problems Confronting Teachers,** Gladys D. Matlock. 12 p. 10 cts. Reprinted from *The Sight-Saving Class Exchange*, Number 59, February, 1937. How to solve certain problems in order to give the whole sight-saving class program balance.

229. **Lacks and Gaps in the Sight-Saving Class Program,** Elizabeth Dasher. 16 p. 10 cts. Reprinted from *The Sight-Saving Class Exchange*, Number 59, February, 1937. Discussion of the educational philosophy which must be kept in mind by the sight-saving class teacher in order that she may guide the emergence of a well-integrated personality with socially desirable life aims in each of her pupils.

230. **What Causes Eyestrain in Children?** Willis S. Knighton, M.D. 8 p. 5 cts. A clear and simple explanation of the common causes of eyestrain in children, indicating the importance of periodic examinations and careful treatment.

231. **Visual Problems in Education,** Lucy V. Ailer, R.N. 12 p. 10 cts. Practical advice based on experience gained as a health supervisor and a county public health nurse.

232. **Study Facilities in College Dormitories,** John O. Kraehenbuehl, Ph.D. 16 p. 10 cts. An interpretation of a survey which was made of lighting conditions in the dormitory rooms of more than 2300 students; suggestions for improvements are made.

233. **Current Trends in Ophthalmology,** A. D. Ruedemann, M.D. 12 p. 10 cts. Outlines the progress made and the goal sought in caring for the eye problems of the school child, as well as the advances made in the technique of treatment of the most prevalent eye diseases, hereditary defects and eye injuries.

234. **Preparing Student Nurses to Assume Responsibility for Eye Health,** Francia Baird Crocker, R.N. 8 p. 5 cts. An outline of the basic principles of eye health which should be studied by the student nurse. It points out the need for variety of experience in hospital and clinic, and closer correlation between theory and care of the patient.

235. **What Public Health Nurses Should Know About Hygiene of the Eyes,** S. Gertrude Bush, R.N. 12 p. 5 cts. Presented at the Annual

Conference of the National Society for the Prevention of Blindness, Columbus, Ohio, December 4, 1936.

236. What is Wrong With Our Fifty Foot-Candle Installations? Ward Harrison. 20 p. 10 cts. An address reprinted from *The Magazine of Light*, which explains three fundamentals of illumination design that affect the comfort of a general lighting system.

D97. Blindness and Its Causes, C. Edith Kerby. Reprinted from *California & Western Medicine*, January, 1937. 12 p. 10 cts. Presented at the Annual Conference of the National Society for the Prevention of Blindness in Columbus, Ohio, December, 1936, this paper advocates a complete analysis of each case of blindness to the end that each shall have adequate examination and treatment necessary to give maximum possible vision, and an adequate summary of facts concerning all cases of blindness.

D98. The Eyes Have It! Morris D. Keller, M.D. Reprinted from *Hygeia*, February, 1937. 4 p. 5 cts. A popular discussion of the many diseases and defects, both ocular and otherwise, which can be diagnosed from the characteristic appearance of the eye in each case.

D99. An Eye Health Program for All the Children, Winifred Hathaway. 8 p. 5 cts. Reprinted from *Public Health Nursing*, April, 1937. A specialist in eye health shows that the same principles of sight conservation as are employed in sight-saving classes are important for all children.

Contributors to This Issue

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Book reviewers: **Dr. John N. Evans,** professor of ophthalmology, Long Island College of Medicine, Brooklyn, N. Y.; **Dr. Park Lewis,** first vice-president of the National Society for the Prevention of Blindness; and **Dr. Knighton.**

The Sight-Saving Review

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Prevention of Occupational Eye Accidents*

Claude S. Perry, M.D., F.A.C.S.

DISCUSSION of the measures which will prevent eye accidents and their more serious complications

IT has been said, "Rehabilitation begins with prevention." This short statement finds its maximum application in our field of preventing accidents to the eye.

According to the division of safety and hygiene, 29,536 claims for eye injuries were filed with the Industrial Commission of Ohio during the year 1935. Of these, 27,980 were injuries to one eye and 1556 to both eyes. A total of 133 eyes were lost during the year. These injuries resulted in the loss of 269,098 working days.

As we consider the above statistics our problem seems to divide itself into four phases: (1) the prevention of eye accidents; (2) the care of the injured; (3) the cost to the employer and to the employee—a cost which can not be reckoned in dollars alone; and (4) the legal aspect.

Study of the first phase, "prevention of eye accidents," presents several points for thought.

It is ridiculous for anyone to believe that even the most calloused employer would knowingly and willingly permit one in his employ to be blinded through accidental means if he were certain he could prevent it. It is incredible that his humanitarianism would let him lose a faithful workman, even if the economic loss did not bother him. From the workman's side it is just as ridiculous to believe that anyone would be willing to go through the pain of losing an eye just to see what it would be like to wear a glass eye. Then just where is the trouble? Is it habit? Is it carelessness,

* Presented at the Annual Conference of the National Society for the Prevention of Blindness, Columbus, Ohio, December 4, 1936.

indifference, false pride or just plain ignorance on the part of the employer or employee?

To-day we are primarily concerned with the measures which will prevent eye accidents and their more serious complications.

Physical Examination Upon Employment

Before a man is employed to do a given kind of work, would it not be better to give him the benefit of a physical examination to determine his fitness for the job? From our point of view there are several reasons for this action. The first and most obvious is to find out whether the applicant has visual acuity sufficient for the job. Not less significant are the questions: Does he have some pathologic eye condition which may be contagious or may become progressive or be aggravated by some minor injury? Does he have some physical handicap not outwardly noticeable but which may be dangerous to himself or his fellow workmen?

The examination of the eyes should be done accurately and carefully. The condition of the cornea, the color and reaction of the iris and the workman's apparent age are important and should be noted in the record kept of the examination. This reminds me of a case of a man employed by one of the largest factories in this country. Following an alleged minor injury to his eyes, this man claimed compensation for loss of sight. The examination made at the time he was hired, two weeks previous, showed him to be of an apparent age of 20, with blue eyes and a visual acuity of 20/20 in each eye. The man applying for the compensation was over 50, with brown eyes and senile nuclear cataracts. There was no evidence of injury. Further investigation revealed that he had purchased his job from the 20-year-old man who was easily able to pass the examination. Congenital colobomas of the iris and other ocular alterations are sometimes used by malingerers with the hope of establishing a claim for damages. The written record taken at the time of the examination will easily disprove any such false claims.

The need for such a physical examination to demonstrate fitness prior to placing a man at a given job may be much more evident than the need for repeated examinations of that same employee at stated periodic intervals. To illustrate, let me cite a typical case of claim for loss of sight, the case of a man who, when employed,

had tabes, a syphilitic infection of the nervous system. Let us assume that no physical examination had been made at the time he took the job and he was not aware of his illness. Some time later he is found unconscious. He has sustained a head injury. He recovers, time passes and he discovers his vision is reduced to less than 20/200, with the visual fields constricted. Investigation could not prove that the accident had not accentuated an ailment already present. Instead of tabes, this might have been an intraocular or retinal hemorrhage associated with hypertension or arteriosclerosis; diabetes; retinitis pigmentosa, chronic glaucoma or some similar condition, as well as the type of case described. Had the company employing the man required a periodic eye examination, the malady would have been discovered in time to avoid the necessity of the payment of a big claim and the man might have learned of his trouble in time to have received adequate treatment.

Eyestrain; Improper Lighting

We have been considering certain phases in the physical examination of the workman. Now let us turn to two factors which affect the endurance of the eyes, namely, the muscles of the eye and improper lighting. The former can be evaluated by the physician, the latter by the lighting engineer.

Fatigue of the eyes causes inefficiency among workers. It is a cause of headache, loss of time from work, spoiling of materials and accidents. Eye fatigue may indicate the need for properly fitted glasses or an unstable ocular muscle balance. You are familiar with the phorias and muscle duction tests, and the great importance the army places on the perfect muscle balance of its airplane pilots. These aviators must have perfect depth perception. If, for example, they should develop a tendency for one eye to deviate outward, an exophoria, and, under fatigue, stress or some illness, this tendency should become manifest, they would no longer have depth perception. Such a condition, even if only of momentary duration, might end disastrously. The same holds true for the auto driver and applies to any occupation where depth perception or stereopsis is essential.

Closely allied to eyestrain is the question of proper lighting.

The light may be so dim that objects can be seen only with difficulty. An artificial light may be so placed that shadows are formed which create an occupational hazard. Often, having the electric light bulbs cleaned at regular intervals is sufficient to eliminate some of the difficulty. Just as the light may be too dim, it also may be too bright. It may be so bright or dazzling as to cause undue retinal fatigue. Our modern lighting engineers have done much to make factory owners light- and glare-conscious. By means of photometric instruments the intensity of light required by an individual for a certain type of work can be accurately determined. Glare or light when reflected from below into the eyes, as from a polished surface, is likewise fatiguing to the retina. The condition of glare is often easily eliminated by some simple measure such as putting a green blotter on a highly polished desk or painting machinery or offending polished surfaces with a flat paint. Reflections from ice, water or tanks of fluid present their special problems.

Safeguarding the Workman's Environment

Having considered the physical fitness of the workman, I wish to say just a word about his working environment. The safety of this environment is reflected by the number and types of cases coming for first aid. If you are the nurse in charge of the factory emergency room, you should not only concern yourself in seeing that your patient receives the best emergency treatment possible but you should note the kinds of injuries and the departments of the factory from which these cases are coming. If the number seems unreasonable, have it investigated by your safety man; then check to see that the cause has been eliminated.

Treatment of Foreign Bodies in the Eye

The most common form of eye injury is the small foreign body, speck of dirt, sand, emery, etc., that gets under the eyelid or is imbedded in the cornea. These incidents seem so trivial to the workman that they are frequently neglected until the following day, when after an uncomfortable night he reports for first aid. As you endeavor to educate the workmen not to neglect injuries, you must warn them of another danger equally as great. In nearly all factories there is usually someone, a presbyopic timekeeper or a

machinist, with dirty hands, who is titled "Doc" and who prides himself on his ability to remove the offending foreign body from his fellow workman's eye. He performs this operation with his none too sterile jackknife, handkerchief, a pointed match stick, nail or like instrument, not bothering with antiseptics or anesthetics. Just as we know of the danger engendered by such methods, so too are the Ohio Industrial Commission and self-insured companies becoming aware of the fact that there is a lessening of expense and better treatment afforded by sending their eye accidents to a physician skilled in the diseases of the eye. It is true that not all localities have an ophthalmologist and must rely on a general practitioner, but to quote Dr. Snyder of Toledo, "A great many of these cases which would be returned to work in a few days without loss of vision if properly treated are so unintelligently handled that there is a small loss of vision up to total economic loss, for what should be only a few days' disability." Any corneal abrasion may become infected and the resultant ulcer heal with scar formation, or, if the abrasion is infected with some virulent germ as the streptococcus viridans, the eye may be lost. It is often the first treatment received after getting a foreign body in the eye that decides the ultimate disability or outcome.

The workers who fabricate metals show the highest percentage of industrial accidents. In the foundries and steel mills we encounter burns of the lids and eyes from sparks and molten metal. When making castings there is danger of hot sand getting into the eyes. After the casting has cooled, the rough spots or scale must be either chipped or ground off. There is a real danger in using cheap hammers, sledges, punches or chisels because when the ends of these tools become frayed or mushroomed, pieces may be broken off and fly into the eye. Such particles are usually not hot enough to be rendered sterile and form a means of carrying bacteria into the eye.

Need for Goggles

Most of these accidents can be prevented by a proper type of goggles. Such goggles should conform to the specifications of the National Safety Code. In some occupations a simple goggle made of shatterproof glass, not isinglass, will suffice. But for a man working with a lacquer spray or in some similar occupation, without

hood, goggles should be provided with soft rubber edges which will, by fitting closely against the skin about the eyes, avoid the entry of irritants. Goggles form a most important link in our prevention program, but goggles are not the only safeguards to be considered. Metal or plate-glass guards can be mounted in suitable positions on machines. Screens should be placed around welders, users of the acetylene torch and workers in similar occupations. Screens, when placed between crowded machines, prevent flying particles from hitting neighboring workmen, or staggering of the positions of machines may serve a like purpose.

There are numerous and often unseen dangers to be found in certain industries which may act as eye irritants or poisons. To mention a few: the fumes from acids or strong alkalies, abrasive dusts, toluene, benzene, certain alcohols, naphthalene, thallium, lead and zinc fumes, etc.

There is another unseen danger which I observed while working as a machinist in a factory some years ago, a danger best expressed in the phrase, "Familiarity breeds contempt." A man may work at one job so long that through familiarity he becomes negligent and does not wear his goggles. Fortune may favor him for a time, but eventually his name will be listed on the emergency room record. And, by the way, even in your profession, where carelessness is outlawed, we have seen that familiarity breeds contempt; else why was it that two Ohio nurses were reported to the Commission as blind from self-contamination while caring for gonorrheal cases last year?

Serious Complications of Apparently Trivial Accidents

Up to the present we have been considering the prevention of eye accidents. There is another phase to be mentioned, namely, the prevention of serious complications from apparently trivial accidents.

Last year there were 25,798 cuts or abrasions filed as claims with the Ohio Industrial Commission. To avoid unnecessary complications, there are certain general rules for you as first-aid nurses to follow. Remove dust or dirt from the eyes, separate the lids and flush the eye gently with a boric acid or normal salt solution, then instill a few drops of a proper antiseptic. The removal of imbedded

foreign bodies should not be attempted. Acid burns should be treated by flushing with running water and referred at once to a doctor. Alkali burns should be handled in the same way as acid burns. Do not attempt to neutralize, as the reaction produced by the acid and alkali may be worse than the burn. After the removal of an imbedded corneal foreign body there is an abrasion. This should be treated with an antiseptic ointment and an eye pad applied in such a manner that the lids do not move under it. When the cornea no longer takes the fluorescein stain, the eye pad can be discontinued. It is important that all char, especially in emery burns, be thoroughly removed. Lime burns are successfully treated with neutral ammonium tartrate solution.

Conclusions

However, it was not intended to discuss the treatment of eye injuries in this paper, but rather to consider a few points in the needful and interesting subject of preventing needless ocular injuries. What has been said only serves as an introduction which we can now summarize.

1. All workmen should receive a careful eye examination before being assigned to a job. I do not mean a perfunctory examination with a card of letters by an eyeglass vendor but an examination by a qualified physician who has had training to recognize disease in its incipiency.
2. Re-examination should be made at periodic intervals.
3. Keep an accurate record of all examinations and treatments.
4. Continuously promote educational safety programs. It is the apparently trivial accident that may need the tetanus antitoxin.
5. Give proper attention to illumination.
6. Insist through supervision that mechanical safeguards are in proper condition and are continuously and intelligently used. A man acquainted with the hazards and a knowledge of safety engineering should be assigned to every factory.
7. Prepare yourselves to give proper emergency care to all injuries. It is much better to refer what seems to be a minor injury to your ophthalmologist than to have the workman doomed to impaired vision, the loss of an eye or total blindness for the rest of his life.

What Are the Educational Facilities for the Visually Handicapped?*

Winifred Hathaway

A PRESENTATION of bases of selection of children for sight-saving classes, together with a plan for how and where the classes should be taught

EARLY education provided for but one group of children, the normal. Unless a child could conform to standards set down for this group, he was given scant consideration and was expected to get along as best he could. But later it was recognized that, so far as education requiring eye use is concerned, there was a group that could, in no wise, conform—the blind—and educational facilities began to be provided to meet their needs.

There existed, between these two extremes, partially seeing children who were misfits in either group, and, although the need of special educational facilities for them was recognized as early as 1802, it was not until 1908 that any definite step was taken for their welfare, through the establishment of myope schools in England. In the United States, in 1913, two classes were established for the education of children with seriously defective vision. Since that date the number has increased slowly but steadily until, at the present time, there are over 500 sight-saving classes in 168 cities, 24 states, District of Columbia and Territory of Hawaii.

The Purpose of Sight-Saving Classes

The purpose of these classes is to make possible an education for those who, because of their serious eye difficulties, cannot advan-

* Presented at the Institute on Conservation of Vision, Brooklyn, N. Y., April 17, 1936; arranged by the Bureau of Prevention of Blindness of the Division for the Blind, New York State Department of Social Welfare; and sponsored by the Eyesight Conservation Committee of the Brooklyn Health Council; Medical Society, County of Kings and Academy of Medicine; and the Brooklyn Ophthalmological Society.

tageously carry on their work under conditions provided for the normally seeing, yet who have enough sight to use their eyes as the principal avenue of educational approach to the brain. The ultimate object is, of course, the same as in all education, so to help children grow and develop—mentally, physically and morally—that they may realize the fullest possibilities that life has to offer them.

Eligibility of Candidates

It is difficult to draw a distinct line of demarcation separating the various groups. In order, however, to have some criteria for placement, the following general classifications are made: In the first group may be included all those having normal eyesight and those having such slight eye difficulties that, with glasses or treatment, they may work advantageously, to themselves and to others, with the normal group. At the other end of the scale will be found not only those totally blind but those having such exceedingly low vision that they must be considered educationally blind, and who, although able to see to a certain extent, must use their other senses, rather than that of sight, as the chief avenue of educational approach to the brain. In this classification will be found, in general, children having less than 20/200 visual acuity in the better eye after refraction or treatment.

The group between these two extremes will be composed of those having a visual acuity of between 20/70 (in some places, 20/50) and 20/200 in the better eye after refraction; children having progressive eye difficulties that are likely to grow worse unless their sight is carefully safeguarded; children with non-communicable eye diseases, or non-communicable systemic diseases affecting the sight.

These three latter groups have been, in the past, considered the bases for selection of candidates for sight-saving classes, but there are three other groups that may be considered as temporary sight-saving class pupils:

1. Children who have had eye operations, such as enucleation, that make necessary readjustments in eye use as well as psychological readjustment.

2. Children who have been suffering from diseases such as

measles that may affect the sight temporarily, who need special eye care until they are able to assume the full responsibility of the regular grade work.

3. Children with muscle difficulties that may necessitate occlusion of the good eye during school hours or certain orthoptic training exercises, in cases in which there may be psychological reactions.

Estimate of Children Requiring Advantages of Sight-Saving Classes

Fortunately, the number of partially seeing children is small in proportion to the school population. The most conservative estimate is that of one in a thousand of the school population. In places where classes have been established for some time and in which careful surveys have been made to discover such children, the proportion is found to be much nearer one in five hundred of the school population.

From this small number it will readily be seen that every school could not support a sight-saving class; indeed, such a class may serve a district, a community and sometimes even a county. Also, it will be obvious that several grades may often be represented in such a group.

Special Qualifications of Instructor

The selection of a teacher is a most important factor. Since children placed in sight-saving classes are of normal mentality, the first requisite for a teacher of a sight-saving class is that she be able to keep the normal attitude. Hence she should have the basic training of one who is to teach normal children, and should have had three, preferably five, years of successful regular grade teaching. The requirements for such training and experience differ in various parts of the United States, each state having its own criteria for foundational work.

In addition to this basic training, a teacher should have special training along the following lines:

1. Anatomy, physiology, and hygiene of the eye, together with a study of common eye diseases and errors of refraction and their psychological reaction;

2. Organization and maintenance of sight-saving classes;

3. Methods of teaching such classes in order to be able to adapt the teaching of the school curriculum to the special needs of each child in her group.

Such teacher must spend her own sight generously in order to curtail the close eye use of her pupils. Hence it is evident that she should have good eyesight.

George Herbert Palmer, in *The Ideal Teacher*, has laid down specific qualifications, without the possession of which he says it is undesirable for anyone to enter the profession of teaching. The first of these is an aptitude for vicariousness; the ability to put oneself in the place of another and to understand his reactions. This is an essential qualification for a sight-saving class teacher, since, without it, it is practically impossible for her to understand the inhibitions and reactions that may result from any handicap, and, more specifically, from the various types of eye handicap.

As the second, he specifies the necessity of a teacher's possessing a wealth of knowledge. Here again, since sight-saving class pupils are unable, because of eye conditions, to seek out for themselves through wide reading many of the things the normally seeing child is able to find for himself, the sight-saving class teacher must be unusually equipped with a wealth of knowledge upon which her pupils may draw.

The third qualification, he states, is the power to invigorate knowledge with interest. The sight-saving class teacher must be able to devise ways and means of invigorating knowledge with interest independent of much eye use. She must constantly be on the alert for new materials and new methods of presentation in order so to arouse and hold the interest of her pupils that they will be carrying on creative work without drawing unduly upon their sight.

Palmer's last qualification is a willingness to be forgotten. Lack of this qualification in a sight-saving class teacher may lead her to succumb to the temptation of permitting partially seeing children, because of their handicap, to become dependent upon her instead of imbuing them with that spirit of independence and self-confidence that will be of inestimable assistance in helping them so to overcome their handicap that they may compete with the normally seeing.

Physical Set-Up and Materials

So much has been written regarding the physical set-up of the special classroom that is to house partially seeing children and of the educational material for their use that it would be repetitious to list them again.*

Method of Instruction in Relation to General Classes

It is very important, in considering any form of education, to guard against the possibility of developing a new handicap in trying to help the pupil to overcome the one that exists. Since the real purpose of any type of education is to enable people to live advantageously in a social world, any barrier that is set up between the normal and the handicapped will necessarily interfere with the carrying out of this purpose. Hence, the barrier of segregation should be avoided in so far as it is possible to do this to the greatest benefit of all concerned.

Sight-saving classes are, therefore, established, in the majority of cases, in public school systems and are considered a very definite part of such systems. Schools are selected having the same grades as those represented in the sight-saving class. Thus, in a system using the 6:3:3 plan, the sight-saving class having elementary school children should obviously be placed in an elementary school building, the junior high school class in a junior high school building, and special arrangements should be made for partially seeing high school students in a high school building. The reasons for this should be evident: That partially seeing children may have the benefit of living with children of their own age and of joining with them in all those activities that do not require close use of eyes. Obviously, work requiring close use of eyes is undertaken in the sight-saving classroom under the direction of the specially trained teacher.

This plan is designated as a co-ordinating or co-operative plan and is followed by over 90 per cent of the sight-saving classes in the United States. In most of the few centers where the segregated plan is followed, an effort is made for some social contact such as

* Hathaway, Winifred. *Room Design and Equipment Requirements for Sight-Saving Classes*, National Society for the Prevention of Blindness, Inc., 1936, Publication number D86. Single copies will be sent upon request to the National Society.

having assembly groups meet together and, in some instances, taking playground activities in unison.

Broad Scope of Sight-Saving Education

It must be obvious that most of the helps and safeguards given to partially seeing children are equally applicable to all groups. If normally seeing children could be given the benefit of the medical and optical service made available for sight-saving class children; if, likewise, they could be given the benefit of the physical surroundings that have been suggested for the betterment of partially seeing children, with the exception of those that are noticeably in the nature of compensation for serious eye difficulties, it is probable that the ultimate need of sight-saving classes might be eliminated.

The Problem of the Cross-Eyed Child*

Le Grand H. Hardy, M.D.

THE author outlines the five main steps in the treatment of the cross-eyed child, which requires patience, knowledge, tact and sympathy

THE problem of the cross-eyed child is a challenge to you, to society and to the doctors who care for him. It is pitiful that in a city like New York there should be 50,000 children starting on life's journey with such a serious physical, social and psychological handicap. It is estimated that 70 per cent of our body activity is controlled by use of our eyes. It is certain that more than 70 per cent of us look at an individual's eyes when we are trying to determine his character, to interpret his expression or to judge his words. Most of a child's learning comes through his eyes and a large part of the impression he makes upon others depends upon how well he is able to use his eyes to control his motions and expressions. The problem of the cross-eyed child has many aspects. Three important ones might be labelled: (1) cosmetic, (2) psychological and (3) functional.

Cosmetic Aspect of Cross-Eyes

The cosmetic effect of cross-eyes is obvious to anyone. It is an unpleasant disfigurement, an embarrassment both to the victim and to those who associate with him. It has been the subject of scores of heartless and thoughtless jokes. In ancient times it occasioned much cruelty because superstitious people believed it to be the result of inhabitation by an evil spirit, and mercilessly beat the poor patient with the intention of driving the evil spirit out of him. In other times it was attributed to inhabitation by an angel

* Radio address presented over Station WABC, October 8, 1936, under the auspices of the Medical Information Bureau of the New York Academy of Medicine.

or benign spirit, and cross-eyed people were worshipped, since they obviously had the supernatural power of seeing in two directions at once. Persecution or worship, their lot was never a happy one, for they were thrown outside the normal life of the communities in which they lived.

From the viewpoint of the eye physician or surgeon the cosmetic problem of cross-eyes is the easiest to handle, since modern surgery makes it possible to operate on a high percentage of cross-eyed patients with an excellent outlook for cosmetic success. That is, in most cases of squint or crossed eyes an operation will greatly decrease, if not eliminate, the disfigurement. Regarded in this light, surgery is a blessing to the cross-eyed child, since it reduces the conspicuous disfigurement and makes it possible for him to get and hold some positions that would otherwise not be open to him. From this first, or cosmetic viewpoint, the problem of the cross-eyed child consists in reducing or eliminating a physical defect, a blemish or deformity which sets a child apart from his schoolmates and makes him an object of pity or ridicule. At the same time, psychologically the reduction or elimination of the physical defect, the distressingly conspicuous disfigurement, improves the child's mental attitude and relieves him of many serious handicaps. The feeling of being different, defective and conspicuous all too frequently produces shyness, timidity and a sense of inferiority which may seriously affect a child's life. Other children are brutal and many adults are heartlessly thoughtless in calling attention to, or speaking of, a child's squint or other defect in his presence. Part of the modern treatment of squint consists in covering up the good eye in order to make the poor or crossed eye work and develop its powers, and many times I have had reported to me the bad effects of friendly but tactless interest. Let me appeal to you, if you like children, please do not embarrass those unfortunate ones by calling attention to their misfortune—either the squint from which they suffer or the bandage or patch used in treating it.

Psychologic Aspect of Cross-Eyes

From this second, or psychological, viewpoint the problem of the cross-eyed child consists in developing or re-establishing the normal

human relationships which are so important in a child's life. If he is later to develop into a healthy normal adult, it is essential that he not be laughed at, ridiculed and ostracized as a child, and this is almost impossible if he goes through adolescence with a squint or crossed eye. Most squinting children are of the nervous type. Frequently they are sensitive, shy and easily hurt. Often they have other signs of poor co-ordinations such as stuttering, stammering and unusual awkwardness in the use of their hands and feet. Frequently these signs are compensated for by definite mental brilliance—cross-eyed children as a group are not dull or stupid. The eye physician, if he is a good psychologist, makes definite efforts to combat these feelings of inferiority, of shyness, timidity and nervousness, and encourages rhythmic games such as dancing, skating and swimming, both as an aid to acquiring those smooth, rhythmic co-ordinations known in sporting circles as "timing," and to establish better control and poise and discourage a feeling of inferiority.

Functional Aspect of Cross-Eyes

The problem of the cross-eyed child from the functional viewpoint is just now a matter of great and nationwide interest to those dealing professionally with the eyes. From this viewpoint the problem is how to develop or re-establish the normal smooth co-ordinations of the eyes so that they work together as a team. The normal human being is a two-eyed individual, and the 12 or more tiny muscles which are used in working the eyes function smoothly and in an almost perfectly co-ordinated manner. This is not true in squint. Not only does the squinting or crossed eye usually fail to see well but its position in relation to the fellow eye and its movements as a part of the team are seriously disturbed. The problem of treating this is a difficult one and has given rise to a whole new method or technique—a branch of ophthalmology known as orthoptics. Orthoptics, or eye exercises, is a method of developing or restoring the normal functions and teamwork of the eyes. Its value in the treatment of squint is still a matter of violent controversy—some claiming almost universal success, others doubting the possibility of any. The truth, as usual, lies between the two. There is no question that in some cases it has

been made into a racket by those with neither the intellectual ability nor honesty to appreciate its true worth. Properly and conservatively carried out, it is an important and useful part of the treatment of the cross-eyed child. It is a training or developing process and like any other form of training, such as piano playing, painting, golf, tennis or surgery, it takes a long time to produce a person who can perform well. Taken at its true value and in conjunction with the other measures used to meet the problem of the cross-eyed child or treat his squint, it is a useful and important adjunct.

What Causes Cross-Eyes

No one knows the whole story of what causes squint and why. It is frequently following some child's disease that a squint or crossed eye is noted and this has given rise to the conviction that the cross-eyes were due to the disease. This is not true. There are probably many causes for squint, or cross-eyes, but there is not real evidence that children's diseases are the specific causes. What probably happens is that the child in its weakened, convalescent state is permitted to overtax his eyes by prolonged reading of story or picture books or playing with toys held too near his eyes. The careful parent will combat boredom and restlessness of the convalescent child by introducing stories and games which involve distance vision rather than the more convenient but also more hazardous use of picture books and printed material.

Should the eyes of your child become crossed following an illness or at any other time, by all means have them examined carefully, completely and at once. The difficulty in achieving a perfect result when treating cross-eyes increases tremendously if the condition is neglected.

How Cross-Eyes Are Treated

The oculist or eye physician has five general means at his disposal for treating a case of cross-eyes or its complications. First he will make a careful test and measurement of the eyes under drops. The drops consist of medicines which relax the muscles of the eye and permit an evaluation of the amount of farsightedness or nearsightedness or astigmatism which is present. Sometimes the use

of drops alone, relaxing the straining muscles, will permit the eyes to regain their normal position. Usually further treatment is required.

The second step consists of accurately measuring and fitting glasses to the child's eyes. The effect of glasses is to focus the light properly and thus spare the eye. Glasses have been fitted to and worn by children less than a year old hundreds of times and without the slightest discomfort. I sympathize with parents who wish to avoid putting glasses on their children, but that sympathy does not extend to a willingness to jeopardize the child's future welfare for the sake of the present cosmetic and economic convenience. Frequently as the child's eyes are made stronger and its co-ordinations consolidated, the glasses may be weakened or removed. In many cases they will be required permanently, particularly if the child is to mature and live under the present conditions of our urban civilization.

The third step in treating a squint is to arouse, stimulate and develop the crossed eye. Whenever an eye turns in, out, up or down, whenever it is not directly pointed at the same object as its mate, one of two conditions must arise: the patient must see double or the image of one eye must be ignored or suppressed. Cross-eyed children do not see double—they suppress the image of the squinting eye. This is done unconsciously and the effect, if we use a telephone as an analogy, is as if the child unconsciously reached up and pulled the plug which connects the eye to the brain. The eye is open and an image is being formed in it, but the image never registers in the brain. The effect of this constant suppression is further to reduce the vision of the squinting eye, which is usually the poorer one, and as this condition persists, the ability to see with the eye is gradually lessened. By focusing the image with glasses and by covering the good eye and hence forcing the poor one to work and develop, it is frequently possible to save or restore the vision of the squinting eye.

The fourth step in treating squint is to teach the child to use his two eyes together in a normal fashion. Many instruments and procedures have been devised for this purpose, none of them so efficient as we would like. It requires the protracted, patient efforts of someone who can arouse and keep the child's interest and

enthusiasm. It is a long, arduous process—orthoptics—but one which, if used with sufficient intensity and persistence, very frequently produces amazing results.

The final step in the treatment is surgical. If the child has been conscientiously carried through the steps we have outlined and the squint persists as it will, according to the latest estimates, in 40 to 50 per cent of the cases, an operation becomes necessary. The operations are usually simple and safe. Combined with the other steps they are usually successful. The unsuccessful operations have, in the past, probably resulted from lack of adequate attention to the four other steps.

Summary

The problem of the cross-eyed child requires patience, knowledge, tact and sympathy for its solution. The cosmetic disfigurement is a serious handicap in making a normal adjustment to life. The psychological effects are bad and require much tact, sympathy and understanding if they are to be handled well and with a minimum of injury to the child. The restoration of function is an important part in the treatment. The ideal treatment and the safe way are to place the child in the hands of a competent eye physician who alone has all the accepted methods of treatment at his disposal, who can use them to fullest advantage and who, if an operation becomes necessary, can operate at the time most favorable for obtaining a perfect result.

The Social Worker in Sight Conservation*

Eleanor Brown Merrill

IN order to have greater concerted social action in safeguarding eyesight, the various threads of community activity which may in any way relate to questions of eye health should be drawn together

IT is interesting to note, in studying lay developments in prevention of blindness throughout the past 29 years, that from the beginning emphasis was put upon the social significance of visual handicaps and the responsibility of social workers in preventing needless blindness and in saving sight. That first committee in New York, from which the National Society for the Prevention of Blindness has developed, was composed of representatives from the Russell Sage Foundation and from the state and city health departments, the founder of the New York Association for the Blind, the founder of Henry Street Settlement and Visiting Nurse Service in New York—so well known over the years as in the forefront of social developments—practicing physicians and others interested in various aspects of community welfare. The first office of this committee, after a preliminary period, was established in the United Charities Building, New York City, in order that there might be the desirable association with other philanthropic activities; also, in the early months, the service of several students from what was then the New York School of Philanthropy was utilized in obtaining information as to eye accidents handled in the surgical dispensaries of New York City.

Through the years of growth in efforts to prevent blindness by the national and local organizations formed for that specific purpose, there is evident an increasing awareness of the problem of safeguarding eyesight—not as the responsibility alone of any dis-

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tinctly specialized agency or group of individuals, but as an obligation on society as a whole; in which the medical profession, public health authorities, nursing groups, educational bodies, industrial and safety organizations, and many other agencies must bear their part if the desired goal is to be reached.

Social work has come more and more into the picture, as, for instance, through actual service in the follow-up of eye cases under medical treatment and in social and educational adjustment of the visually handicapped. Of even greater portent, however, seems the permeation of social work principles and technique into the whole structure of prevention of blindness programs. In case work, emphasis is put upon the need of understanding one's client, of treating him as an individual rather than as a member of a handicapped or unsuccessful group. Are not understanding and an individual approach equally important in our community relationships and in developing that team play between organizations which is so essential to progress? As Health Commissioner of New York State, Dr. Parran once said: "In the nation at large there is more than usual need for open-mindedness, for respect for the point of view unlike our own, as well as a courageous tenacity in adhering to what is truly valuable in established methods." The social worker particularly, by nature of her profession, must weigh the value of existing activities, must see how the programs of others fit into her own plan of accomplishment, and must bring her service into harmony with the whole.

The present is a period, it seems to me, of special challenge for us all—the challenge to meet and to adjust ourselves to the complexities of an increasingly mechanized age; the challenge to establish working relationships between public and private agencies—both of fundamental importance; the challenge to uphold and improve standards of service; the challenge to utilize fully all available sources which might directly or indirectly contribute to the success of our program; the challenge to interpret fairly our aims and to influence public opinion.

I think of the social worker in a program for safeguarding eyesight as one who draws together the various threads of community activity which may in any way relate to questions of eye health, and weaves them into a pattern to be followed—not routinely, but

with flexibility—and with willingness to adapt her plan to the individual situation. Her responsibility is to secure such procedures as may lead to the greatest saving of visual loss, both through the stimulation of such service as can be properly carried by existing agencies, and through the initiation—perhaps on a demonstration basis—of such distinct and supplementary service in this field as may be needed. Among sight conservation measures which must be brought about, whatever their allocation, may be mentioned: provision of adequate eye health care in the schools; proper diagnostic service and treatment, where indicated, for all expectant mothers; proper care of infants' eyes at birth through prophylaxis, medical and nursing care and eye hygiene education; facilities for insuring eye examinations and correction for all preschool children; control of occupational eye hazards in industry; and provision of proper medical care for all eye disorders.

The aim of the prevention of blindness worker is towards the ultimate inclusion of these measures in the community program. On the schools will rest responsibility for carrying out the details of vision testing and ophthalmological examination, for establishing sight-saving classes, for perfecting the school environment in its relation to eye health. A proper control of eye conditions recommended for treatment must be secured through interplay of ophthalmologist, teacher, school nurse, social worker, clinic. Health departments, physicians and hospitals must co-operate in the provision of prenatal examinations where laboratory tests and treatment for all positive cases of syphilis are so vital a measure in the prevention of visual difficulties. Here the importance of proper interpretation to the patient is evident. She must realize the danger to the expected child, the possibility of transmission to others, the need for protecting her own eyes against possible complications. In a recent article, Dr. Exner of the American Social Hygiene Association named as a main social service function the proper instruction of patients under treatment for syphilis, whether this be during prenatal or other stages. The importance of following up contacts in the home cannot fail to be recognized. Let me cite an instance which, alas, is far from unusual.

A 13-year-old girl reported at the eye clinic of a state hospital and was diagnosed as having interstitial keratitis. Since she lived out

of town, the social worker's plan had to include arrangements for her care while under treatment as well as for bringing her family to the hospital for examination. Both parents showed positive Wassermann tests and a brother and sister were found to have congenital syphilis—though of this whole family the child with eye symptoms had been the only one recognized as needing medical care. A plan was worked out with the local doctor whereby all could receive treatment in their own community.

Upon health departments rests the major responsibility for regulations relating to care of babies' eyes at birth. Regulations, however, are far from complete unless accompanied by provisions for proper follow-up and case control, as well as by continuous education. A report came to the National Society for Prevention of Blindness recently from a southern state where five ophthalmia neonatorum cases were found through the vigilance of the prevention of blindness worker—just in time for useful vision to be saved in all of the cases through immediate hospitalization. This state requires use of prophylaxis at birth, but enforcement and education have been slow.

Medical examinations for preschool children have been made more widely available each year through the ministrations of health departments, child welfare centers, schools, day nurseries, summer round-ups under the parent teacher associations, etc. In these examinations, increasing recognition is being given to the question of eye health and to the possibility of preventing the development of serious eye difficulties by giving early attention to minor or incipient troubles. The following case illustrates the opportunity through a case work approach for more than correction of the immediate difficulty.

An Italian boy of six years, when given a vision test in kindergarten, was found unable to distinguish any but the largest symbol on the chart. When brought for ophthalmological examination, there was found good reason for his backwardness in kindergarten and his failure to concentrate on any but hand work. The immediate vision difficulty was helped with glasses, and the change in this child's personality and alertness was marked. Moreover, the family, hitherto unresponsive to any efforts of the social worker to straighten out certain complications and secure indicated medical treatments, became fully co-operative and awoke to what might be

accomplished through proper attention. There was an appreciation of the boy's improvement which changed the entire family's attitude.

To secure proper medical care for all eye disorders is an ambitious aim, but none too ambitious in view of the high incidence of blindness and impaired vision caused by ignorance and neglect. Hand in hand with medical science must go the interpretation of factors involved in the disease and its treatment. There must be adjustment of social and economic difficulties obstructing the road to successful results, the securing of continuous care when required through establishment of confidence and through the necessary follow-up.

The hospital social worker has a very distinct part to play. In the clinics she has opportunity to work with the ophthalmologist, to learn his opinion in regard to the case and what its implications are for the future. She must relate this knowledge to her social plan for patient and family. Reference to a glaucoma patient under treatment in one hospital clinic indicates the wide range of factors which may be involved.

A Spaniard needed first of all a Spanish interpretation of her condition in order to allay the fears induced by her language difficulty. There was needed on her part a re-establishment of confidence, and on the part of the doctor an explanation of the patient's unresponsiveness and emotional upset. The relief agency required interpretation of the patient's medical needs and occupational limitations. Finally, after two operations, there was the need for referring this patient to a doctor in her home town for continued care.

That the social worker has a real contribution to make in decreasing the loss of sight from glaucoma has been evidenced in a study conducted over a number of years at Massachusetts Eye and Ear Infirmary in Boston, through the assignment of a worker in the social service department to follow all glaucoma patients in order to prevent lapses in treatment and to secure the fullest possible co-operation from patients. In a period of seven years the number of cases under care increased from 200 to over 1000, of which 654 were of primary type. Of these last, who reported to the clinic regularly from year to year, only 51 had to be referred to the Divi-

sion for the Blind—a telling result in view of the disastrous effects upon eyesight of this disease if left unchecked.

Though social case work as it relates to glaucoma patients may offer particularly graphic results, yet the value of this approach cannot be limited to any one type of eye disease, nor to any group of individuals. The social worker may or may not be present in clinics to handle the eye cases calling for follow-up and adjustment. It is encouraging to note that hospitals are more generally recognizing the worth of such service, and that it is on the increase. However, eye patients must not be allowed to suffer loss of sight for lack of hospital social work, and vision must not fail to be saved for lack of an understanding and a willingness to participate in the program. Family workers, public health nurses, teachers, volunteers—all have their part to play, and the eye social worker has a peculiar responsibility in providing what is needed in the way of instruction and interpretation. The call is for united action; for supplementing as we can the services of others in joining in a common cause through contributing what may be thought of as a special technique to the whole program for community welfare.

Eye social work, as we conveniently term it, is not new, though of late years more emphasis has been put upon special preparation for those entering this field, and upon the importance of education in the various aspects of a sight-saving program. As with all constructive efforts, there must be knowledge of the reason for action, appreciation of the results of failure, understanding of the technique to be employed. With general awakening of interest and intelligent comprehension of the problem, may we not look to ever greater concerted social action in the field of safeguarding eyesight?

Factory Lighting and Accident Prevention*

E. W. Murray, M.I.E.E.

SPECIFIC examples of the need for good illumination in order to relieve the high and unnecessary expenditure of energy which always accompanies a badly designed or glaring installation

I DO not propose to deal with the subject of industrial illumination in any of its more technical phases, but rather from the common-sense point of view, embracing methods which have been found in practice and have had to be altered to achieve the desired results; ideas which are being used with much benefit to the workers; and also a forecast of what might be expected in the future as regards both artificial and natural illumination.

Education in Illumination

In the first place, illumination education proceeds at a very slow pace. It is true that progress made during the last ten years in shop-window and display lighting has been great, and much the same might be said about street and decorative lighting in the theatre and cinema, and in some homes, but it appears to require a further period of years for the improvements in the home to be adapted to the requirements of lighting in factories, and unfortunately the same progress has not taken place there. It cannot be hoped that factory lighting should follow the lines of cinema lighting, for instance, but there are a number of points of principle that could be followed with great advantage. The usual complaint, when improvements are suggested for the illumination of a factory, is that there is no money to spare for such services, but since the same excuse is usually given for any suggestion whatsoever, it is

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only by mentioning the matter a sufficient number of times that some improvement is attempted. The same might be said about machine guarding generally, but eventually, when the guards are fitted, it is frequently said, "Why haven't we done this before?"

Accuracy in Fundamentals

Be sure of your ground when you are putting forward a scheme for improvements in illumination. It is so easy for a superior to turn a scheme down and, in many cases, it is because the persons putting the scheme forward have not made themselves conversant with the particular matter. Try to see clearly the objects which the operatives are expected to see under the worst conditions, or at the end of the day, when the nerves may be a little overwrought. A casual glance is useless. It is an easy matter to strain one's eyes for a short time, but do so for hours on end and you will find that it is little wonder that some operatives complain of eyestrain and headache. If this method is adopted, you will be able to deal adequately with the refusal to approve a scheme.

Remember, also, that no amount of illumination will ever correct a person's defective vision, so that one's scheme will be for persons who have normal vision, or vision corrected to normal by glasses. In addition, adult workers will generally require more illumination than juveniles since the latter have a keener sense of vision.

You will also want to know something about the amount of illumination required for some particular class of work. A number of guides can be obtained from the usual gas or electricity concerns giving suggested illumination values for practically every industrial process. A guide is issued by the Illuminating Engineering Society, and two others by H.M. Stationery Office. These latter give the findings of the Departmental Committee on Lighting in Factories and Workshops. These reports should be in the hands of everybody who has authority in any business, since they give the minimum standards of illumination for all kinds of work. It must be emphasized that the figures in the Government reports are the minimum illumination values only, while the other figures are a guide for designing new installations. Lamps and mantles age and get dirty or broken, burners fill up with dust, reflectors discolor and become dirty, and, in times of heavy load, the gas pressure or

voltage falls. All these items seriously decrease the illumination with little or no reduction in the running cost. So that, if you design an installation from the minimum figures, making allowances for the aging of the light sources, the discoloring of reflectors, etc., I think you will find that you have arrived at an initial figure which will indicate that the figures referred to in the Government publications are only apparently low.

Good illumination is a real necessity in order to relieve the high and unnecessary expenditure of energy which always accompanies a badly designed or glaring installation. Many instances can be cited where improved illumination has resulted in an increased output, and these improvements must have been accompanied by a reduction in fatigue. In one case I have in mind an increase of about 15 per cent in output was obtained when the illumination was raised from 5 to 23 foot-candles. Further, I hope to show you how much easier and quicker work can be seen when the illumination is increased, even where rough work is being performed which calls for very little discrimination.

Natural and Artificial Lighting

Now, this does not mean that the intensity of the artificial lighting need be as high as that of natural illumination, but we should try to copy at least the qualities of natural lighting, so that the best lighting scheme that can be adopted is good general lighting. On the other hand, however, the design of a building, or the position of the windows, may adversely affect the natural illumination of a room, yet we seldom hear of complaints about natural lighting, and trouble from this source is frequently overlooked. It is important that natural and artificial illumination should be considered together.

In one factory, which is top lighted, a number of power presses are fixed in rows along the shop and parallel to the top light. Now, the overhead gear at the top of the power presses throws shadows on the working areas or dies, and the illumination readings taken during natural lighting were 65 foot-candles in the gangways outside the presses and 0.75–0.6 foot-candles on the dies. These readings were taken on a dull, rainy day and it was interesting to note that it was on such days as these that complaints were made

by the operatives. Naturally, the management pooh-poohed the idea because they had viewed the complaint from the general illumination in the shop, and not from the operatives' viewpoints. Further, the operatives had to look through the power press guards to endeavor to see their work. The brightness on their side of the guards was naturally higher than that on the dies or the work within the guard. The trouble was the high degree of contrast. This is a case where artificial illumination of a high order is required on the dies during daylight, in order to reduce the illumination contrast in the operative's field of vision. Following up this idea, the high artificial illumination on the bottom dies, if used during the dark hours, would have required, in turn, a reasonably high artificial illumination in the shop, or the contrast would have persisted—but in the opposite direction—so it follows that the illumination on the dies should be equal to, or a little higher than, that of the general shop area. This could perhaps be remedied by using the double filament lamps used in the motor industry for head lamps.

Requirements in Certain Industries

It is found that factory occupants are not always aware that the provision of suitable and adequate lighting is called for in many of the regulations made under the Factory Acts. The following are some of the industries mentioned: building, ship-building, fruit preserving and in dock premises, together with certain requirements as to lighting where locomotives and milling machines are used. Further, in factories where woodworking machinery is in use, the regulations call particular attention to the need of good illumination, both natural and artificial, and they also stress the disadvantages of shadows. I know you will appreciate the increased accident risk that is likely to arise through poor illumination, or shadows, with such high-speed cutters, saws, etc., as are used in the woodworking industry and that there is still a fair amount of work yet to be undertaken before industrial lighting can be considered satisfactory. A chart exhibited in the Home Office Industrial Museum records monthly the reportable accidents in factories and workshops. The increase in accidents during the winter, or the months when artificial lighting is necessary, is very noticeable—a large proportion of these accidents being due to persons falling.

Imperfect Lighting and Accidents

The disposition of lights for a working area should be carefully selected and placed so that the operative is not troubled by shadows of parts of the structure, or even of himself, and particularly by shadows of moving objects. We must not lose sight of the effect on one's nerves and the consequent fatigue involved in the presence of an erratic, moving shadow. A flickering light, due to quick variations in mains pressure, may be just as nerve-racking as a moving shadow, and this is not an uncommon fault to be found in factories. Instances of this nature occur in both gas and electrical installations. In the case of the latter, the trouble is usually due to a bad joint in the belt or the need of a flywheel to smooth out the speed variations of the works transmission gear.

Shadow Conditions

But shadows are not always undesirable. In a few industries they are necessary in order to show details, in very much the same way that an architect depends on the shadow effects produced by the sun on his building.

A typical case of this nature is drilling, and the following case which was investigated may help others to avoid the same mistake.

A section in the drilling shop of an engineering works had been rewired for a general lighting scheme of some 8 or 9 foot-candles of illumination. The old scheme consisted of individual lights at each machine, some machines having portable leads and hand lamps without reflectors. The drillers' complaint was that they could not see their work as easily as with the old scheme. The trouble here was entirely due to the good general lighting scheme. The indentations made by the center punch marks ("center pops") were as evenly illuminated as the surface of the metal, so that the drillers had to find the indentations with their fingers and then to move the drill and the center punch marks in line. A pocket battery hand lamp indicated the usefulness of directional lighting by illuminating one side of the center punch marks more than the other. This showed the drilling marks quite clearly.

Directional lighting is necessary in all cases where the unevenness of a surface is the point of importance, as in printing, embossing, weaving, goffering, fustian cutting, drilling, carving, etc.

The provisions of proper illumination on the work can influence the efficiency of guards for many dangerous operations on machines. We may have the case where the shadows thrown by the guards are a disadvantage. If wire mesh guards are used, it is quite possible that shadows will not be so sharp if general lighting is installed. It would be quite different with individual lighting. We must remember also that any lighting scheme will give a higher illumination on the outside of the guards than on the work within the guards. Where there is any form of screen between the operative and his work, some form of lighting should be provided on the side of the screen remote from the operative. I want to lay stress on the importance of directing the light on to the work in the same direction as that in which the worker is looking. To install lights at the back of the machines is very bad practice, because the operative has to contend with the reflected glare all the time that artificial lighting is in use.

A glaring light is always a hindrance to vision and distracts from an otherwise adequate illumination level. Lights without reflectors, or the use of shallow reflectors on the light sources, should never be allowed. In fact, the light source should be one of those things that the eye should not see. Artificial lighting is not alone in causing this trouble, and if the windows are on the sunny side, great care is needed in the placing of machines.

Very Fine Work

Where work of a very fine nature is executed, it is not always possible to overcome the difficulty of seeing the work by illumination alone. If one attempts to see the fine details of the threads in woven silk, or artificial silk, or the fine wires used in wireless components, or even in burling and mending, it will be found that the object has to be held quite near to the eyes—say, some 6 to 9 inches—and many workers are now being provided with special magnifying spectacles. This problem was the subject of a special investigation by Mr. H. C. Weston, of the Industrial Fatigue Research Board (now the Industrial Health Research Board), and is very ably explained in Report No. 49 on "The Relief of Eye Strain among Persons Performing Very Fine Work," published by the Stationery Office. The principle employed is, in a measure, the

use of magnifying lenses, and when these are properly and correctly fitted to suit the individual worker's normal vision, they afford a marked help to the operatives in reducing the fatigue of the eye caused by the angle of convergence and accommodation.

Inspection of Polished Surfaces

The detection of flaws, scratches or blemishes on highly polished surfaces which are large in area and flat has been the cause of a number of complaints of eyestrain and fatigue. These polished surfaces reflect the source of illumination upward into the workers' eyes, and the trouble is caused by the contrast in brightness seen on the surface. It is necessary, therefore, to provide light sources having large areas. For very large sheets a type of inverted trough about three feet wide and nine feet long, fitted with a translucent screen below the lights, has given satisfaction. The illumination brightness of the screens used is about 3 to 4 foot-candles per square inch. This figure could, perhaps, be increased a little, but to not more than 5 foot-candles per square inch.

Low Voltage Lighting

The provision of small low voltage lamps with reflectors for illuminating the working area of machines is steadily increasing. This method of lighting can be used to advantage on almost any type of machine and is a useful asset in giving the worker some illumination in an area where it is most needed. The more general method of obtaining the low voltage is the use of the double wound transformer which may be attached to particular machines so that the voltage drop on the secondary winding is negligible. If the secondary winding is designed for 12 volts, "bus" lamps should be used because they have a longer life than motor car lamps though they are a little less efficient, i. e., they take more current for the same illumination. To summarize, the advantages of this form of lighting are:

1. Being small, the lamps and reflectors can be placed between the worker and his work, the beam of light being thrown in the direction in which he is looking, so that he is not subjected to reflected glare from the wet, oily or shiny surface of the work or of the machine. (The reflected glare is always away from the worker.)

2. The light can be placed in the optimum position.

3. Current consumption is low, and maintenance costs for renewals are also low, compared with normal voltage lamps.

4. There is little risk of electric shock, particularly if one of the secondary terminals is "earthed."

Some manufacturers of machine tools, woodworking machinery and sewing machines have incorporated a light of this nature in the design of the machines. And, in cases where the machines are electrically driven by A.C. power, the motor stator may form the core of the transformer, and a coil (the secondary) may be inserted into a slot milled into the outer side of the stator. The ends of this coil are taken to two terminals on the motor frame from which the light supply can be obtained. This low-voltage local lighting should never be the only lighting in a room or factory. The suggested method is to provide, in addition, general lighting of 2 to 10 foot-candles, according to the requirements.

Lighting of Textile Processes

Even quite recently, in a few lace factories in the Midlands, the use of candles was fairly general. All the threads on the lace-making machines have to pass through separate holes in a type of guide or reed plate which is placed about two feet from the floor at the back of the machine. The machines are generally placed back to back and, because of the overhead mechanism and the side frames, there is little natural or artificial illumination available from the normal room lighting. The workers, in order to repair a broken thread, resorted to holding a small metal plaque between the lower joints of the first and second fingers of the left hand and a lighted candle was affixed to the center of the metal plaque. Great care was needed not to set alight the nearby threads with the candle.

The latest development for lighting this class of work is to install permanent lights with small trough reflectors within the machine or, alternately, to use portable low-voltage handlamps, provided with a ring to fit over the middle finger, or a loop to go over the hand.

The threading of reed frames for looms is another case where an improved method of lighting is required. I have not yet seen a

good installation. During the daytime the operative sits with the work between him and a window, across which is stretched some white gauze or tissue paper, and in this way the heels in the reeds can be seen and threaded easily. There is no reason why a more-or-less translucent screen, illuminated from the back with lights and suitable reflectors, should not be used during the dark hours.

Artificial Daylight

Artificial daylight is more constant than natural lighting. Such lighting, however, should be confined to special areas where some kind of inspection of colors or goods, for example, is being made. A general artificial-daylight lighting scheme for a large room is often found to be rather cold and depressing. The inspection of razor blades is one operation for which it has been found suitable, the inspection usually being carried on in small cubicles, each with its own light and lined with black velveteen.

Natural Lighting

The tendency in modern design of factories is to increase the area of the windows and, while this is very satisfactory from the safety, health and welfare sides, generally some special treatment is necessary during the few hot summer days to reduce the heat and glare from the sun. In winter, also, the large expanse of glass calls for the provision of additional heating. The effect of the sun's glare and heat can be reduced by color-washing the glass, or improvising blinds on the outside of the windows. In some cases a permanent canopy of suitable width has effectively shaded the upper portions of windows, and in others the use of radiant heat-resisting glass has proved satisfactory. One of these glasses also proves to be a very satisfactory light disperser and has the advantage of presenting a good, white surface on the inside. It is, therefore, a good reflector for artificial illumination during the dark hours.

Dispersive, or prismatic, window glass is not used to the extent it should be. In many old buildings, where the ceilings are low and the rooms deep, these types of glasses can provide valuable improvements in natural illumination. With clear glass the angle at which the light reaches the tables or benches at the back of the

room is a frequent cause of complaint because of the contrast within the field of vision. Dispersive glass prevents this trouble.

Maintenance

The truth of the old statement, "Soap and water are cheaper than the energy required to provide light," is not yet fully realized. This applies equally to windows, lamps, reflectors and shades, and I know factory occupants who have been astounded at the increased illumination after a thorough cleaning of the light units. Such demonstrations are usually better accomplished with the aid of a light meter, and, as an outcome, firms have purchased light meters which are passed on to the managers of the different shops, with a log book. The illumination readings at specially selected points in each shop are recorded monthly, or bimonthly, and in this way those concerned with the cleaning and the renewal of aged lamps are able to deal with them before the illumination becomes too low.

What Does the Student of Institutions for the Education of Teachers Know About Eye Health?*

Anette M. Phelan, Ph.D.

IN giving an exposition of the results of a test taken by 887 students in 12 teachers' colleges, the author explains the need for a more searching form of test

STUDIES recently published by the American Child Health Association[1] indicate a high incidence of visual defects among school children, the ineffectiveness in the school programs for the detection and follow-up of visual defects, and the fact that the classroom teacher holds a strategic position in the program.

A recent review of school health practices[2] reveals the fact that eleven states have made mandatory provisions for the testing of vision by teachers and six others have made provisions of one sort or another for delegating the testing task to the teacher. Only one state requires by statute that the institutions for preparing teachers instruct them in vision testing.

A survey[3] of the curricula of a group of institutions for the preparation of teachers in the eastern states disclosed that of the group studied, only those required by law to do so offered instruction in vision testing to their students.

The writer investigated the required curricula of 10 institutions for the preparation of teachers in 7 states and held personal con-

* Presented at the Annual Conference of the National Society for the Prevention of Blindness, Columbus, Ohio, December 4, 1936.

[1] Franzen, Raymond. *Evaluation of School Health Procedures*, American Child Health Association. New York: School Health Research Monographs, No. V, 1933.

American Child Health Association. Physical Defects—The Pathway to Correction, 1934.

[2] Rogers, J. F. *Statewide Trends in School Hygiene and Physical Education.* Washington: U. S. Office of Education. Pamphlet No. 5, 1934.

[3] Spencer, Mary E. *Health Education in Teachers Colleges and Normal Schools.* New York: Teachers College, Columbia University, 1934.

ferences with the faculty on the subject matter content of the curricula. The evidence indicated that when other demands had been met, there was left but a minimum of time for attention to the eye health problems of the school child. There was no opportunity for determining whether the use of the limited time allotted for consideration of eye health problems equipped the prospective teacher with the essential information and skills.

A survey of eye health problems in the service area of some of the institutions for the preparation of teachers revealed conditions that could hardly have existed where teachers were familiar with the facts related to eye health of children. Some of the conditions commonly found were:

Classroom window shades were drawn to cover the upper third or half of the windows;

The space near the window was used for tables, fern stands, lockers, etc., while schoolroom desks were arranged on the dark side of the room;

Desks were arranged in hollow squares, with some children working in their shadows and others facing the window;

Nearsighted children were seated towards the rear of the room;

Children showing effects of eyestrain were seated in a part of the room not well lighted;

Assignments on blackboard were placed on glare areas or in dark corners;

Glass-covered pictures were placed on front wall of classroom;

Children rated on intelligence or achievement on results of paper and pencil tests taken in poorly lighted sections of the room;

Children were rated on achievement or intelligence by means of paper and pencil tests without an investigation of vision status;

Young children were subjected to drills requiring close eye work, namely, quick recognition of symbols and words on their printed pages;

First-grade children were imbued with a sense of failure over their inability to meet artificial reading standards set for promotion to second grade;

Teachers were unable to administer a routine vision test with the Snellen chart and lacked an understanding of limitations of the test or significance of the results;

Teachers were ignoring observable behaviors and conditions of children which suggested the presence of visual defects.

The presence of the problems discovered in the survey, together with the consideration of the results of the earlier studies, indicated the need for an instrument which would effectively separate the facts on eye health of children known to teachers from those not known. With that in mind, a preliminary objective test of the true-false type was constructed, with one false statement to four true, and a two-to-one ratio between specific statements of fact and statements of popular interpretation.

The facts to be tested were selected from *Conserving the Sight of School Children.*[1] This report was selected as a basis for the test inasmuch as the manuscript had been given the benefit of approval by 100 specialists in health and education, including 25 ophthalmologists on the executive board and advisory committee of the National Society for the Prevention of Blindness.

The facts selected dealt with the mechanism of vision, its growth and development; the prevalence of common visual defects among school children; the characteristics of visual defects and their significance to school achievement; the instruments used for routine vision tests; the limitations of the tests and the significance of the results, as well as the proper conditions under which the test might be used; the standards for adequacy of illumination of a classroom; and the factors conditioning the adequacy of illumination and the characteristics and sources of glare.

The test questions lent themselves to classification into four groups, each dealing with a definite area of information, as follows: Group A, visual defects: recognition and measurement; Group B, the visual mechanism—its growth and development; Group C, influences of visual defects on children; Group D, environmental factors in vision.

It was hoped that through the use of the test we could determine what knowledge on eye health the graduate of a teachers' college possessed. The test was given to about 900 college seniors in 12 teachers' colleges. The papers were scored and the responses tabulated and analyzed by the statistical bureau of the Metropolitan Life Insurance Company. Table I indicates the results.

[1] Published by the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association with the co-operation of the National Society for the Prevention of Blindness. Revised, 1935.

The evidence in Table I suggests that if the test was reliable, seniors in teachers' colleges know more about the eye health problems of children than we have believed. However, correct response to popular interpretation was consistently higher than to precise statements of fact.

Areas of information covered by the test and types of statements in each area	Number of Statements by Type			Per Cent Correct Response by Type of Statement		
AREA	Precise*	Popular†	Total	Total	Precise*	Popular†
A. Recognition and measurement of visual defects	19	6	25	64	57	87
B. The visual mechanism, its growth and development	28	3	31	64	64	79
C. Influences of visual defects on children	6	11	17	87	90	86
D. Environmental factors in vision	12	15	27	81	77	85
Total Nos.	65	35	100	73	67	85

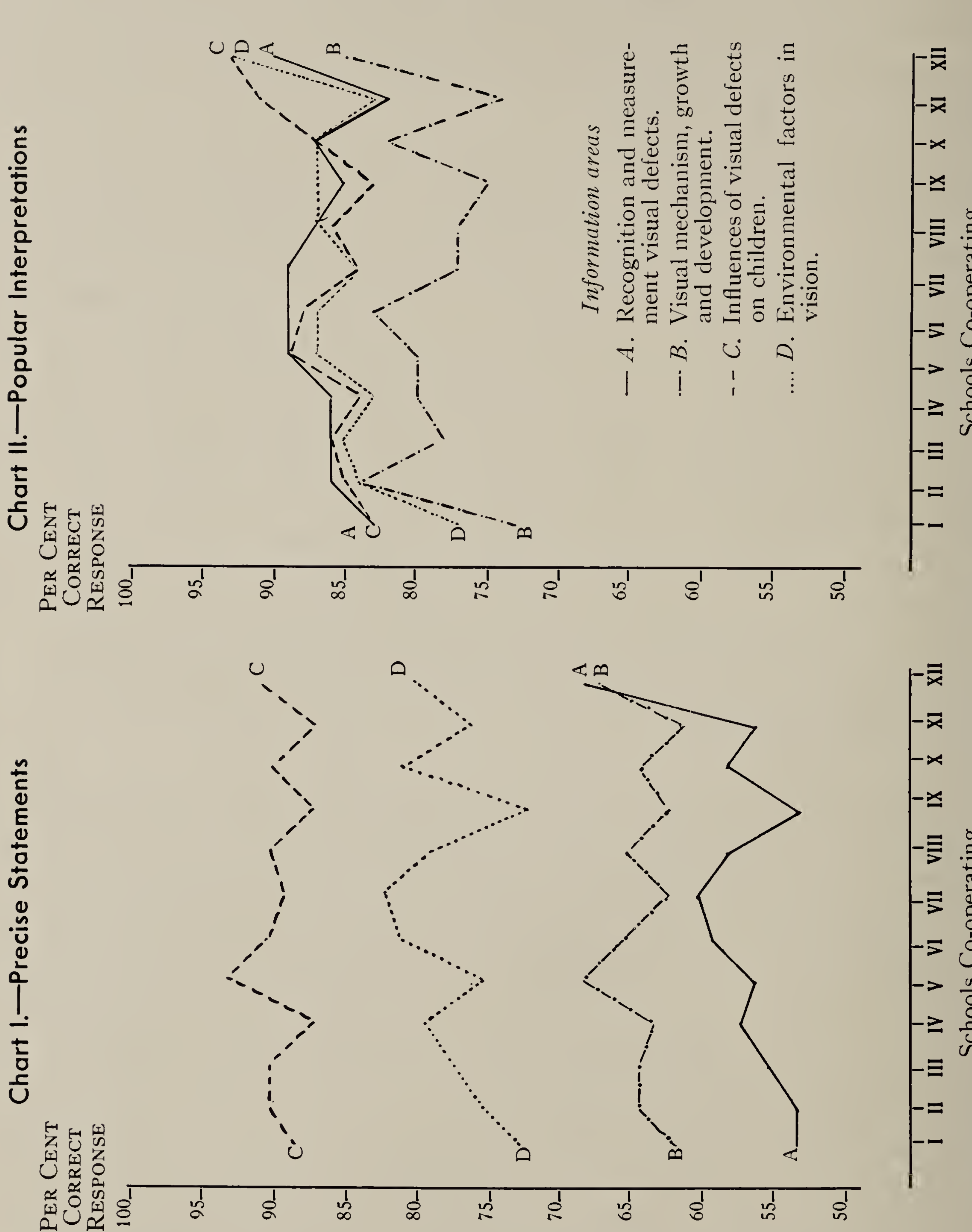
TABLE I.— Analysis of correct responses to the objective test on eye health problems of school children by 887 students of 12 teachers' colleges. January–May, 1936.

* Precise statement of fact.
† Popular interpretation.

A comparison of correct responses by schools to the four areas of information showed that, with two exceptions, the seniors of the different colleges appeared to be fairly even in their knowledge and that the number of correct responses to area C was about 90 per cent; D, slightly below 80 per cent; B, between 60 and 70 per cent; while A was between 50 and 60 per cent. This is shown clearly in Chart I. When Charts I and II are compared, it is evident that the response to popular interpretations tends to be higher than to precise statements.

An analysis of test results suggests several weaknesses of the tests as follows:

a. The number of precise statements of facts should have been comparable in the four areas of information. The predominance of popular interpretations in one area had the effect of making it appear that students knew more about that area than about the others. The truth is that in the area



Percentage of Correct Response to Questions on Eye Health Problems of Children by 887 Students in 12 Teachers' Colleges

in question (the influence of vision on the child's development and achievement) research has not been as productive of convincing evidence as it has in the other areas.

b. The true-false test in itself is probably less searching than some other type.

c. The predominance of true statements—ratio of four true to one false—may have favored the correct response. Half of the false and four-fifths of the true statements had a correct response from more than half the students.

A valid test should reveal the real status of student knowledge of the facts incorporated. It is my belief that the test as a whole did not do this. I believe, however, that some of the items in the test did. Since these items incorporated fundamental facts, I should like to call your attention to them.

*55** No. 25. Early discovery of the tendency to use one eye is one of the first steps in the prevention of farsightedness.

*67** No. 35. The power of blending the two images develops in the brain of the young child.

*14** No. 97. The perception of depth develops normally throughout the first twelve years of life.

The adult responsible for young children needs to be aware of the fact that the eyes of children are growing; the mechanism of vision and visual perceptions normally are, in the developmental period, subject to interference and warping. Yet the response to item number 97 reveals that only 14 per cent of the students were aware that the nursery school and kindergarten age period is important in the development of depth perception. Little more than half the students were aware of signs of interferences with fusion.

*23** No. 21. In nearsighted eyes, the outer coat of the eyeball usually is lacking in toughness.

*61** No. 11. The eyeball of the nearsighted child is relatively long from front to back.

*59** No. 77. In the nearsighted eye, the distance from the front curve of the eyeball to the retina is greater than in the eye with normal vision.

* The figure at the left indicates the percentage of correct response to the item.

Schools of ophthalmology are not in complete agreement as to the specific relationship of school work to progressive myopia. The unsettled questions deal with (a) the influence (in extreme convergence) of convergence muscles on the shape of the eyeball, and (b) the effect of gravity pull on the shape of the eyeball when the head is bent forward and the face is held close to the desk. Yet ophthalmologists are agreed that myopia is closely associated with a lack of toughness in the outer coat of the eyeball; also that a reduction of close eye work is advisable and outdoor life desirable for nearsighted children.

Yet the response to item number 21 indicates that less than one-fourth of the students knew that a lack of toughness of the eyeball was an important element in nearsightedness, and according to the responses to numbers 11 and 77, a little more than half knew the relative distance from the corneal curve to the retina in near-sightedness and farsightedness.

*56** No. 78. The normal field of vision on the temporal side extends 90° from the line of direct vision.

*67** No. 98. When desks are arranged parallel to the window wall, the field of view of the children includes the windows.

A narrowed field of vision is a distinct handicap to an individual in that it constitutes a safety hazard and disqualifies him for many occupations. It may also be associated with a serious condition and calls for prompt observation by an ophthalmologist.

Yet the response to number 78 showed that slightly more than one-half the students knew that the width of the normal field of vision was equal to the diameter of a half circle lying in the horizontal plane in front of the shoulder line.

A field of vision of normal width indicates that eye efficiency and comfort depend upon the absence of a bright light within the field. Half the students were able to apply this fact.

*38** No. 19. The muscles of accommodation cannot clarify the image of the farsighted child.

*26** No. 5. The visual defect most frequent among school children is farsightedness.

* The figure at the left indicates the percentage of correct response to the item.

The farsighted child uses the ciliary muscles to clarify distant images. An increased burden is placed on the ciliary muscles when such children attempt to clarify the image of nearby objects. These facts hold implications for adjustment of relative demands of learning through first-hand contact and through the use of the printed page, and for relatively short periods of close work; also for an understanding that prolonged close work for children may result not in retinal fatigue but in fatigue of the ciliary muscle. Yet slightly more than one-third of students responded correctly to number 19, and according to the response to number 5 only one-fourth of the students suspected the incidence of farsightedness.

*54** No. 58. Rays of light from a point 20 feet distant are practically parallel.

*54** No. 24. In testing distant vision, the test chart is placed 30 feet away from the subject to be tested.

*58** No. 7. The normal mature eye needs to make no muscular effort to get a clear image of objects 20 feet or more away.

Rays of light from any point 20 feet, or 6 meters, distant enter the eye practically as parallel rays. This fact is important in that 20 feet is the nearest distance at which the normal mature eye can get a clear image with the ciliary (accommodation) muscles at rest. For this reason the distance (20 feet) is the nearest point at which distant vision can be tested.

This fact holds implications not only for careful measurement of distance for the vision test but also for the intelligent selection of activities involving distant vision. Yet the responses to numbers 58, 24 and 7 indicate that one-half of the students knew the facts regarding rays of light and that about one-half could apply the facts to the placement of the chart for testing distant vision.

*47** No. 92. The human eye responds more favorably to a mixture of daylight and artificial light than to artificial light alone.

*48** No. 86. On winter afternoons, the light fades from the sky at a rate more rapid than that at which the human eye adjusts to the change.

* The figure at the left indicates the percentage of correct response to the item.

The teacher is in a strategic position for adjustments necessary to provide adequate light of good quality for the classroom. She should know not only the reasons for using daylight whenever possible but also when it is important to use artificial light in the classroom. Yet less than half the students knew that the human eye responds favorably to a mixture of daylight and artificial light, or that there was a real reason for turning on the artificial light early on winter afternoons.

*58** No. 34. The Symbol E chart cannot be used to test the vision of children who cannot read.

*56** No. 80. The routine distant vision test in current use in schools is very effective in detecting farsightedness or astigmatism.

*52** No. 63. A visual acuity rating of 20/30 represents a visual efficiency of about 60 per cent.

*42** No. 44. An intensity of from 7 to 10 foot candles is a good level of illumination for a vision test.

Some states provide by statute that classroom teachers assume responsibility for vision testing; others, that the teacher shall participate in the activity. Yet according to the results of the test only about half the graduating class in teachers' colleges understand the use of the Symbol E chart, its limitations or the significance of the results; while less than half know that there is a desirable level of intensity for the vision test. There may be some excuse for the low per cent of accurate response to number 44, since that information probably has not been widely spread as yet; but the information inherent in numbers 34, 80 and 63 should have been in possession of all prospective teachers.

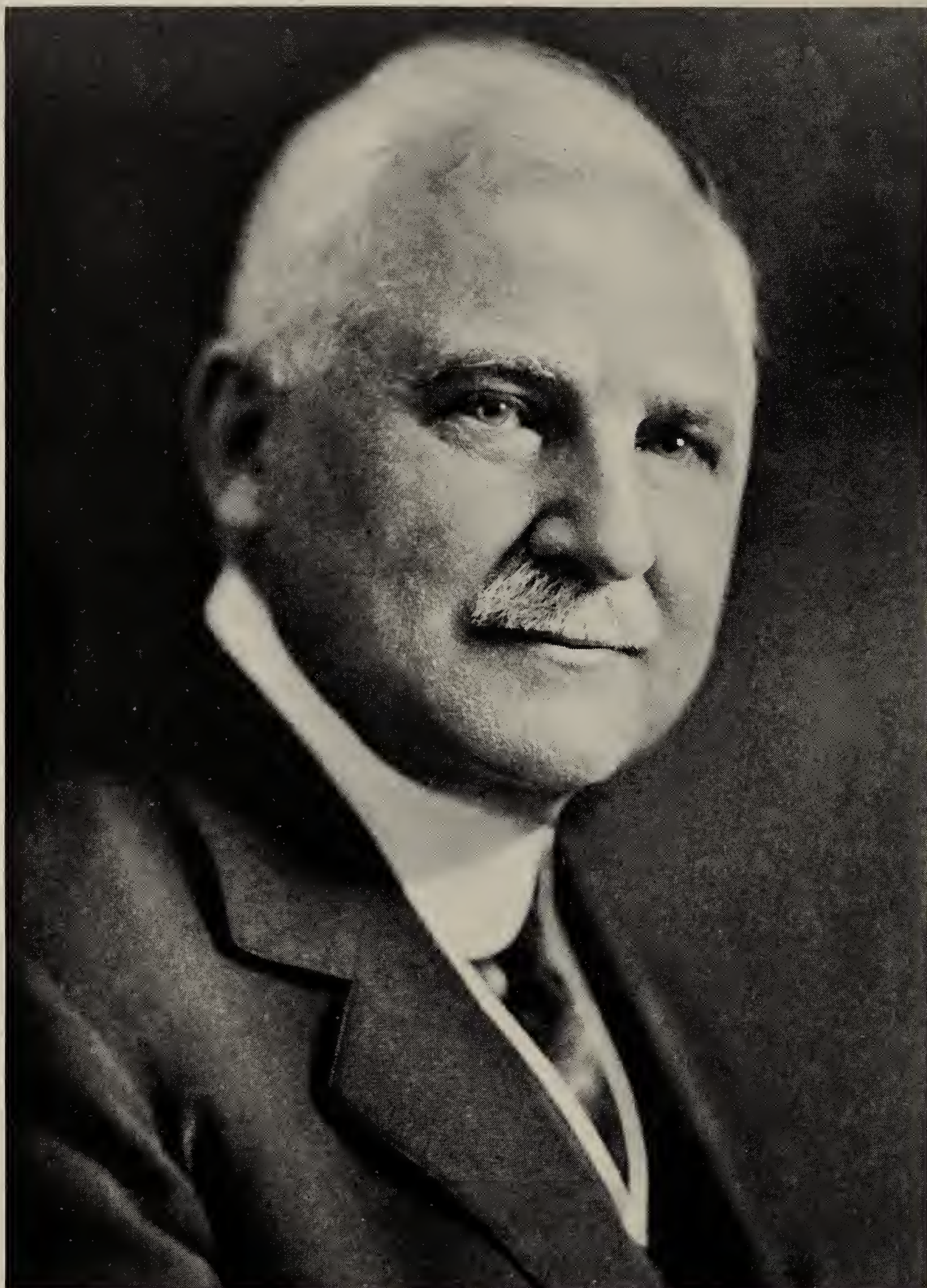
Since the survey of a selected group of items reveals a lack of student knowledge of fundamental facts related to the eye health of children, I believe that a more searching form of the test would give a true picture of student information.

With that in mind, a revised test in a form more searching than the earlier one is presented. True-false items are used only in instances where the fact does not lend itself to a good test item in the multiple-choice form.

* The figure at the left indicates the percentage of correct response to the item.

In the new form test each area of information is represented by the same number of items; whenever possible, the test item deals with a precise fact instead of a popular interpretation; and an attempt has been made to select items dealing with functioning facts rather than those that are purely academic.

It would be interesting to use the improved testing instrument with teachers in service and with seniors of teachers' colleges. The results of a study with such a test given to the seniors of institutions for preparing teachers might furnish an index by which we could determine what the graduates of such institutions should be expected to know about the eye health of children.



Edward M. Van Cleve
1867–1937

Editorial

Edward M. Van Cleve*

THE impetus to prevent a difficulty has, from time immemorial, grown out of a preceding tragedy. It was because of his experience with the blind that Edward M. Van Cleve felt the urge and the necessity of preventing further tragedies of darkness.

When, in 1915, the New York State Committee for the Prevention of Blindness and the American Association for the Conservation of Vision joined forces to establish a national lay organization for the prevention of blindness, Edward M. Van Cleve was the logical person to serve as its managing director. From that time forward he gave of his experience, his interest and his untiring effort to the accomplishment of the aim of the national organization—for eight years as managing director and since that time as a member of the board of directors and the executive committee. The very life of the organization, in the critical period following the World War, was saved through the determination and self-sacrifice of Dr. Van Cleve.

Under his direction the work of the original State Committee spread into a great national movement, and it was because of his mental vision, the physical counterpart of which he labored to protect for others, and through his wise counsel, that the National Society was able to weather the financial difficulties of the early thirties.

The members of the board of directors, the executive committee and the members of the staff who worked with him through the years realize that the foundation he laid is the basis for all new building in preventing blindness and conserving sight. This is the only monument he would desire, and in recognition of his achievement the board of directors, this twenty-seventh day of May, nineteen hundred and thirty-seven, spreads upon its records this minute in memory of one who brought light for darkness.

* Resolution adopted at the regular meeting of the board of directors of the National Society for the Prevention of Blindness, May 27, 1937, following the death of Dr. Van Cleve on May 21.

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request

Blindness Prevention *

It has been estimated that the financial cost of blindness in the United States, including loss of earning power, is in excess of $40,000,000 a year and that in three out of four cases blindness is preventable by present known means. It may be caused by disease or by accident. Among the specific diseases leading to blindness the foremost are cataract, atrophy of the optic nerve, ophthalmia neonatorum (babies' sore eyes), glaucoma, trachoma, and progressive myopia. Less frequent troubles are disorders of the retina, cornea, iris, and choroid, as well as cancer and amaurosis. Among the more general affections leading to blindness are measles, meningitis, scarlet fever, and influenza. Venereal diseases are directly and indirectly responsible for a considerable amount of blindness in both acquired and inherited forms.

External injuries causing blindness result from flying objects, explosives, falls, cutting and piercing instruments, and so forth. Also included are foreign substances in the eye, poisoning (together with the action of chemicals), exposure to heat, and others. In addition, structural defects or malformations of the eye are to be numbered among the causes of blindness. There is ample evidence that hereditary influences play an important part in some cases. From what is known, however, there seems to be little more danger of the transmission of blindness from parent to offspring when both parents are blind than when only one is without sight.

On the whole, the outlook for the prevention of blindness is encouraging if proper action is but taken. Much threatened blindness might be warded off by skilled medical or

* Reprinted, with permission, from the *Social Work Year Book, 1937*, Fourth Issue, pp. 43, 44.

surgical treatment; infectious diseases could be brought under further control; and such serious causes of blindness as cataract and glaucoma might be made to show an appreciable decrease by suitable treatment and with greater attention to general health. One form of keratitis (inflammation of the cornea) might be curbed by better nutrition and sanitation; another, by more thorough-going control of syphilis. Trachoma, an outstanding cause of blindness in some areas, has shown itself amenable to a definite program for its eradication, including improvement in dietary and sanitary standards, better reporting and follow-up of cases, periodical examinations of suspected persons, and establishment of hospitals in infected areas.

Ophthalmia neonatorum, formerly a widespread cause of blindness among children, is yielding to the attacks being made upon it and is now responsible for only one-fourth as much blindness as it was 30 years ago. Laws requiring the use of silver nitrate in the eyes of babies at birth, the reporting of all inflammatory eye cases in young infants, the providing of prophylactics, and other measures have been extremely effective in the reduction of this disease.

Safeguards for the protection of the eye are in continually greater use in factories, while industrial workers are being increasingly taught the importance of safety measures. A healthy public opinion is being created with regard to the hazards connected with fireworks. Better lighting is appearing on every side—in homes, schools, business buildings, and factories. Examination of the eyes of school children is a part of every well-regulated school health program.

Sight-saving classes for children with vision too seriously impaired to permit their beneficial attendance at regular classes, but who can use their eyes in reading of large type under advantageous conditions, were first introduced in the public schools in 1913. There are now almost 500 such classes in various schools throughout the country.

The National Society for the Prevention of Blindness is the one national organization concerned solely with this work. It stimulates research; promotes popular education upon the subject through lectures, exhibits, films, and so forth; encourages the provision of medical social service in eye hospitals and clinics; conducts institutes and consultation service for public health nurses; assists in the establishment of sight-saving classes in schools; carries instruction in eye health to teacher-training institutions; assists in the establishment of state and local programs for prevention; and encourages the enactment of appropriate legislation. There are also a few state and local organizations which are doing valuable work. The medical

profession, both individually and in formal associations, is attempting to meet its responsibilities in sight conservation. Notable service is also being rendered by agencies of public health, industrial safety, and public welfare. Most organizations concerned with the welfare of the blind make prevention one of their outstanding functions. Hitherto prevention of blindness has been largely engaged in as a private undertaking, but signs are not lacking that it will become more and more a public activity.

Of much significance was the organization in 1930 of the Committee on Statistics of the Blind, fostered by the American Foundation for the Blind and the National Society for the Prevention of Blindness, for the purpose of securing fuller and more accurate statistics upon the subject.

HARRY BEST, Ph.D.
Lexington, Ky.

Don't Abuse Your Eyes!*

Children take their eyesight for granted. It came along with them like their teeth and their hair and their arms and their legs. Every member of the body is precious, but if one had to be preferred to any other, eyes would come first. To be able to see is to have dominion over a large part of one's heritage, and to lose that power, even to a degree, is tragic, irremediable loss.

Eyes are sensitive where teeth and hair and arms and legs are resistant and tough. You can get false hair and false teeth, and an imitation of an arm, or of a leg, and manage, but there is no substitute for an eye. It is better to guard well the one you have, knowing that there can never be another.

Children do not know this. They give no thought to their eyes nor to their vision. They cannot be expected to understand the care that modern living makes imperative if eyes are to last their full time of usefulness. Children know nothing of the effects of eyestrain, of the dangers of poor light, bad print, dirty towels, dirty hands, or rough usage in relation to their eyes. But grown people know, and it is their duty to teach and to keep on teaching children the care of their eyes.

When a child has frequent headaches, loses interest in school lessons or indicates a dislike for books, have his vision tested by an expert. If glasses are ordered, get them and insist that the child wear them as directed. Inform the teacher about this and ask her co-operation so that the child will not wear his glasses in his pocket. Many a case of poor eyesight in maturity could have been prevented by the use of glasses in school days.

Insist that children read under a good light or not at all. They will read by the fading light of evening

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until the black shadows lie on their books. Eyes are so accommodating to the situation imposed upon them that it is not until it is too late that we discover they have done their utmost and can do no more forever.

Rubbing eyes with dirty hands and using dirty towels are other ways of causing eye trouble. Teach little children about this. Make it their habit to keep their hands away from their faces, particularly their eyes, and make it habitual for them to use only their own clean towels.

Eyesight is so precious that those who have it in perfection ought to treasure it beyond all other physical endowments and guard it as such. Once it is gone it is gone forever. Regrets and tears and bitterness of spirit are the price of carelessness.

ANGELO PATRI
New York, N. Y.

Communications

Anti-Fireworks Campaign in Cincinnati, Ohio

Prior to July 4, 1935, fireworks hazards had been a constant menace in Cincinnati and its vicinity. The use of fireworks became such an integral part of Fourth-of-July celebration that a large branch of a fireworks factory was established just outside of the city limits. In the later years before 1935, there was usually bedlam for about three days instead of one. The annual toll of injuries for the eight years preceding 1935 averaged 200 in the city hospital. This meant that only the severe 200 free cases were listed and an unknown, much greater number were treated privately. My records of private cases showed an annual average of five persons with ocular injuries directly due to exploding fireworks.

On July 4, 1935, an unusual number of ocular injuries were seen at the city hospital and in private practice. One handsome lad of 10 years had received a laceration through the entire diameter of the cornea and ciliary body with a collapsed globe. His lids were terribly lacerated. His mother, in the eighth month of pregnancy, was completely prostrated, the father was beside himself, and the combination made a very tragic scene. It developed that the boy himself was not using the fireworks, but that a can filled with dirt and powder had been carried through the air by the explosion of the powder, striking this boy in the face and mutilating his eye. There were several other lost eyes that day, and the sum of the experiences was so shocking that a most bitter resentment was roused against such a useless and vicious practice. The following day the city safety director was interviewed. He was shown the list of injured and the unretouched photographs of the three individuals with lost eyes, and within one-half hour an ordinance was being pre-

pared in the city solicitor's office. The president of the Cincinnati Academy of Medicine was asked for support, and he immediately asked and received permission from all the members of the Academy Council to support an anti-fireworks law. The newspapers, for the most part, supported the movement. The city council, being composed of only nine members, was quickly enlisted and when the law committee of the council met to consider recommendation of the law for passage, various presidents of mothers' clubs and two of the little patients were present for the hearing. The atmosphere thus created was almost irresistible and, in spite of attempts to soften the ordinance, the following iron-clad law was passed:

Section 1. That the Code of Ordinances of the City of Cincinnati be supplemented by adopting Sections 561, 561–1, 561–2, 561–3, and 561–4.

Sec. 561. The term "fireworks" as used in this ordinance shall mean all rockets, roman candles, bombs, balloons, wheels and other substances and devices for pyrotechnic display; all firecrackers, blank cartridges, torpedoes and concussion canes, pistols and other devices for the explosion of caps or cartridges, or any substance designed or intended to produce a visible or audible pyrotechnic effect by combustion, explosion, deflagration or detonation, except sparklers, blacksnakes, colored fires or flares and non-explosive novelties.

Sec. 561–1. It shall be unlawful for any person, firm or corporation to offer for sale at retail or to sell at retail, to loan, barter, deliver or give away within the City of Cincinnati any fireworks as defined in Sec. 561, except to holders of permits as provided in Sec. 561–3.

Sec. 561–2. It shall be unlawful for any person, firm or corporation to purchase at retail, use, fire, set off, discharge, set in motion or to ignite within the limits of the City of Cincinnati any fireworks as described in Sec. 561, except as provided in Sec. 561–3.

Sec. 561–3. Special permission may be granted to persons, firms or corporations for the purchase of fireworks as described in Sec. 561 and their use at a public gathering, provided an application is filed with the city manager setting forth the name of the applicant, the time and the place of the exhibition. The city manager on being satisfied that the applicant will use the fireworks in a public exhibition, and being satisfied that all reasonable precautions will be exercised with regard to the protection of the lives and property of all persons, may issue a permit which shall permit the use of fireworks at the time and place set out in the application.

Sec. 561–4. Any person, firm or corporation violating any of the provisions of Sections 561–1 and/or 561–2 shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not more than one hundred dollars ($100.00) for each offense.

On July 4, 1936, the contrast was unbelievable. Instead of the usual din, there were picnics, parades and celebrations at amusement parks. Night displays of fireworks were

operated in the parks by adult employees holding permits. In this way, the haphazard handling of dangerous explosives in casual hands was completely eliminated. Instead of the usual casualties listed, there was no case of fireworks injury received at the city hospital and there were only two minor burns reported in the entire city. These were suffered by two young men who had purchased gunpowder at a firearms store. It was obvious that a well-regulated law can be most effective in curbing the useless maiming of individuals by fireworks.

Albert L. Brown, M.D.
Cincinnati, Ohio

Cataract with Acute Secondary Glaucoma Following the Use of Dinitrophenol*

During the past year about 40 cases of cataract have been observed following the use of dinitrophenol for weight reduction. Alpha-dinitrophenol is a yellow, crystalline powder, soluble in alcohol and in ether. It is a dye closely related to trinitrophenol, or picric acid, is a catabolic stimulant and produces pyrexia, or sweating, but no change in the blood pressure and pulse rate. During the World War the French physicians observed cases of poisoning by dinitrophenol in munition factories.

Using experimental animals, the increase in metabolism with oral doses of from 5 to 10 milligrams per kilogram weight is about 50 per cent; with higher doses the animals produce heat so fast that they may die from hyperpyrexia. The stimulation of the metabolic rate, according to Cutting and Tainter, is peripheral and is due to an increase of oxygen consumption in the tissues; it is independent of nervous and glandular action. The French workers observed in the experimental animals a marked increase of the carbohydrate content of the body, particularly that of liver glycogen, and a corresponding rise in the blood sugar, so that they believed that the excess metabolism was at the expense of carbohydrates.

Gruber also speaks of the glycogenolytic action of dinitrophenol. Its use for weight reduction has been extensive in this country only for the past three or four years. Tainter and Cutting reported that, in 1934, 1,200,000 capsules of the drug were given to about 4,500 patients in the Stanford Clinic of San Francisco. They stated that at least 100,000 people were treated with dinitrophenol in this country during the same year. The average time which elapses between first taking the drug and the appearance of cataract is from five to fifteen months. It is because of this delayed effect that reports of dinitrophenol cataract appeared only during the past year. We certainly

* Report of two cases presented before the ophthalmologic section of the New York Academy of Medicine, May 18, 1936.

may expect many more cases of cataract in the near future. There seems to be an individual susceptibility to the development of cataract, as the number of dinitrophenol cataracts is comparatively small in proportion to the number of obese patients treated with the drug. All patients reported took the drug within the recommended therapeutic doses and, in nearly all, the lens changes progressed rapidly, so that within a few weeks, vision was reduced to hand movements. All cataracts seemed to have a characteristic morphology. With one exception, all reported cases were women, and the age varied from 25 to 50 years.

Our two cases differ from the others reported in the literature by complication of the cataract with acute secondary glaucoma. Only two other similar cases were reported—by Shutes. In view of the rapidity of swelling of the lens, it is rather surprising that no more cases of glaucoma were reported in this type of cataract.

Case Reports

A female, aged 42, presented herself on September 5, 1935, with acute glaucoma of the left eye. Both lenses were cataractous; soft, flocculent precipitates throughout the cortex and clear intervals between the opacities, like a splitting between fibers, were made out on slit-lamp examination. Vision of the left eye was reduced to hand movements and that of the right to 6/200. An iridectomy was done on the left eye for reduction of the tension. Six days later the patient was seized with a glaucomatous attack of the right eye because of the rapid swelling of the lens, and an iridectomy was performed on this eye also. In two months a cataract extraction was performed on each eye with an interval of two weeks. The vision of both eyes was restored to normal with correction. The amount of dinitrophenol ingested during nine months was 54 grams and the total loss of weight was 49 pounds.

A female, aged 38, consulted Dr. Berens because of pain and poor vision in the right eye. The intraocular tension was high in the right eye and the lens was swollen and opaque. An iridectomy was performed on the right eye and 15 days later one on the left eye. A cataract developed within a short period on the left eye too. Cataract extraction was done on both eyes with an interval of three months. The patient received a total amount of 125 grams of dinitrophenol during a period of eleven months.

Olga Sitchevska, M.D.
New York, N. Y.

The Need of Large Print Books in Residential Schools for the Blind

The book, *Everyday Manners*, brought up in our minds the possibility of having our present braille textbooks paralleled with large print type books. Beyond the sixth grade very little is available in large ink type. At the Minnesota School for the Blind nearly one-half of the

student body is in the sight conservation department. The lack of large print text books in the upper grades and in the high school makes the use of braille increasingly necessary. We feel that this is a handicap because it slows up the reading speed of sight-saving class girls and boys. It is a well-known fact, furthermore, that children who can use their eyes safely, even though they are defective, will not rely on braille after leaving a school for the blind. The present law as it is drawn up and as it covers the Federal appropriation for text books for the blind may possibly need amending. At any rate, we feel that the usefulness of the American Printing House will be tremendously increased if it can be permitted to print large-type books.

A lack of large-type books penalizes unduly the semi-sighted child. The totally blind children, of course, depend on their braille; the child with normal vision has a world of reading material at his command. The semi-sighted child, however, must use either braille or small print, neither of which is suitable.

Residential schools "for the blind" are going to need an increasing number of large-type books. We in Minnesota are anxious to parallel our present braille texts with 18- to 24-point ink print books as soon as possible.

J. C. Lysen
Faribault, Minn.

Winifred Hathaway

"To WINIFRED HATHAWAY, whose inspired service in behalf of sight-saving classes for visually handicapped children has made her another LADY WITH A LAMP."

Inscription on Leslie Dana Gold Medal, 1937.

Note and Comment

Leslie Dana Award to Winifred Hathaway.—Readers of the REVIEW will join in the jubilance of every worker for prevention of blindness at the award of the Leslie Dana Gold Medal to Mrs. Winifred Hathaway, associate director of the National Society for the Prevention of Blindness. Mrs. Hathaway was selected for this honor by the St. Louis Society for the Blind, through which the medal is offered by Mr. Leslie Dana of St. Louis.

This highly prized token of recognition in the field of public health was given to Mrs. Hathaway at a luncheon meeting of the Association for Research in Ophthalmology, in Atlantic City, Tuesday, June 8, during the convention of the American Medical Association. The presentation address was made by Dr. Park Lewis, who was awarded the Leslie Dana Medal in 1928.

Mrs. Hathaway is the second woman to be accorded this honor. In 1926, it was conferred upon the late Miss Louisa Lee Schuyler, of New York City, who was chiefly responsible, with Dr. Park Lewis, for the founding in 1908 of the National Society for the Prevention of Blindness. Last year, the medal was presented to Dr. John M. Wheeler, Professor of Ophthalmology in the Medical School of Columbia University and Director of the Eye Institute at the Columbia-Presbyterian Medical Center in New York.

The inscription on the medal this year reads: "To WINIFRED HATHAWAY, whose inspired service in behalf of sight-saving classes for visually handicapped children has made her another LADY WITH A LAMP."

Mrs. Hathaway has achieved an international reputation through her many years of service in the campaign to save eyesight, especially for her work in promoting the establishment of sight-saving classes in which children with seriously defective vision receive a normal education with a minimum of eye-strain. Largely through her personal inspiration and encouragement, there are now 525 such classes in 168 communities throughout the United States.

She has probably brought the story of the need and the methods of safeguarding sight to a larger number of persons than any other man or woman in America.

Survey of the Eyes of 1,000 Commercial Drivers.—Dr. Edwin H. Silver discusses, in the *Journal* of the American Optometric Association, Dr. Alvhh R. Lauer's research on the relationship of visual acuity to safety. Dr. Lauer examined more than 1,000 commercial drivers employed in five states. The summary of the findings indicates that 43 per cent of these drivers do have accidents and 57 per cent do not. Visual acuity of at least 40 per cent as measured on the Clason instrument is necessary for the safe driving of commercial vehicles and 60 per cent or over is desirable for greatest safety. According to the study, there is no marked relationship between color blindness and accidents. High accident liability seems to be associated with the narrowed field of vision. Drivers having this defect are of two kinds—compensators and non-compensators. The former have no difficulty but the latter are bad risks. Because of the fact that the better eye and the dominant eye are not always the same, differences in acuity between the two eyes do not seem to be correlated with accident proneness. Astigmatism scarcely seems to be a factor in safe driving.

The *Journal* contains the full report of the research of the American Optometric Association, and presents not only the above facts but also an outline of the analysis of the study; consideration of results, together with a series of graphs showing the relationship between acuity and performance; the relationship between acuity and other conditions; the relationship between accidents and visual conditions; the relationship between astigmatism, accidents and performance; and the relationship between phorias and accidents.

Effect of High Altitude on Color Vision.—A recent issue of the *Optician* (London) publishes the following interesting item on the relationship of high altitudes to color vision:

"In order to investigate the effects of reduced barometric pressure on vision a German investigator has made use of a pressure chamber in which barometric pressures corresponding to sea-level, 3,000, 5,000 and 6,000 meters of altitude, could be obtained. His subjects all had normal color vision under ordinary pressure and, although some did not appear to be affected by reduced pressures, a greater number showed a considerable reduction in their discrimination for colors and brightness. A person with normal color

vision could be temporarily rendered an anomalous trichromat under reduced pressures, while an anomalous trichromat could be changed to a dichromat.

"These investigations are of interest as they point to the possibility of an airman being rendered dangerously color blind during a flight."

Blindness Caused by Mustard Gas.—Added evidences of the endlessness of war ravages are manifesting themselves in the appearance during the past three years of many cases of "delayed-action" blindness caused by exposure to mustard gas in the World War. According to a recent issue of the *Medical World*, the first sufferers were noted three years ago. Thus far 24 cases are recorded.

World Federation of Education Association Meeting.—Miss Fumiko Fukuoka, who completed her work as a scholarship student of the National Society for the Prevention of Blindness, will speak on "The Eye Health of School Children," before the health section at the meeting of the World Federation of Education Association to be held in Tokio, Japan, August 2 to 7, 1937. Miss Fukuoka, upon her return to Tokio this summer, will join the medical social service staff of St. Luke's International Medical Center.

How We See Moving Pictures.—Why moving pictures appear to us to be pictures in motion rather than the rapid succession of still pictures they really are is explained by recent work from the Columbia University biophysics laboratories. Dr. Selig Hecht, chief of the department, is well known for his studies on how we see, particularly for his researches into how the bleaching by light of a dye called visual purple, the sensitive material of the eye, results in vision. In a talk delivered to the biologists at Rutgers University he recounted a series of researches on why a light turned on and off fast enough appears to be uninterrupted. Light bleaches the dye which the eye regenerates. In darkness a larger amount of it is built up than in light. It is this which makes us more sensitive to light after being in the dark. When a light flickers fast enough, as is the case when we see motion pictures, not enough visual purple is built up for the eye to become specially sensitive to the following flash of light; hence, no flicker is per-

ceived. But when the light flickers more slowly, as for instance at the fifty-times-a-second of the electric light bulbs in the New York subways, enough visual purple is rebuilt in the dark periods to permit the eye to realize that there is a flicker.

Paint Colors Have Light Reflecting Values.—The Bergen County Federation of Boards of Education, in a recent issue of their *School Bulletin*, pointed out the importance of clean and light-colored surfaces, particularly of ceilings and upper walls, as a part of the lighting system in schools. Light colors are important reflectors of daylight and artificial light and it is therefore important for every school administrator to study the light-reflecting qualities of individual classrooms in order that each child may have a better opportunity to conserve his vision. Dull, flat paints should be used in order to avoid glare. The following table shows the comparative reflection values of paint colors:

Color	*Per Cent*	*Color*	*Per Cent*
White	89	Buff	63
Ivory	82	Pale Green	59
Canary Yellow	77	Shell Pink	55
Cream	77	Bright Sage	52
Caen Stone	76	Silver Gray	46
Orchid	67	Olive Tan	43
Cream Gray	66	Forest Green	22
Ivory Tan	66	Coconut Brown	16
Sky Blue	65	Black	2

Sight-Saving Classes in the U.S.S.R.—In 1932 the Institute of Children's Health in Leningrad addressed a request to the National Society for the Prevention of Blindness for information regarding the materials which should be used in classes for children with poor vision, as well as information about the organization of sight-saving classes and about occupations which are suitable for partially seeing young people. This year the Society was pleased to hear again from the Institute to the effect that 20 classes have been established in Leningrad and that the work is going forward effectively with the strong approval and help of the government.

National Society Notes.—Lewis H. Carris, managing director, visited five states and took a brief trip into Canada during the past three months. In Washington, D. C., he attended a

meeting of the committee on conservation of vision of the State and Provincial Health Authorities and attended a hearing on Bill 1634 concerning the education of the physically handicapped. He also attended a hearing several weeks later, in Harrisburg, Pa., before the state legislature there regarding an appropriation for the prevention of blindness program of the Pennsylvania Association for the Blind. After his trip to Washington, Mr. Carris went to Chicago, where he conferred with the Illinois Society for Prevention of Blindness. In Portland, Me., he spoke at a Rotary Club luncheon, before the board of directors of the Cumberland County Public Health Association, and to a group of school principals, special teachers, nurses and physicians, on the subject of the responsibility of schools in the conservation of vision. In Columbus, Ohio, he attended the celebration of the one-hundredth anniversary of the founding of the Ohio State School for the Blind. "How May We Better Inform Physicians and Educators of the Importance of Conservation of Vision Classes?" is the subject of his talk at the annual conference of the American Association of Workers for the Blind, meeting in Toronto, Ontario.

Mrs. Winifred Hathaway, associate director, addressed three groups—the Parent-Teachers Association of Fort Lee, N. J.; the League of Women Voters of Pelham Manor, N. Y., at the invitation of the chairman of their child welfare committee; and members of the regional conference of Girl Scouts, Inc., at a round-table gathering on "The Girl Scout with a Physical Handicap."

Mrs. Eleanor Brown Merrill, associate director, conferred with the State and Provincial Health Authorities in Washington, D. C., and attended a meeting there of the Inter-organization Committee on Eye Hygiene, for the purpose of discussing the proposed demonstration of a prevention of blindness program. In connection with this program she also met with members of the Maryland Society for Prevention of Blindness. During the last week in May Mrs. Merrill attended the National Conference of Social Work in Indianapolis, Ind., where the National Society had an exhibit. She addressed the Public Health Nursing Association of Indianapolis and conducted a luncheon meeting of the Committee of Medical Social Eye Workers. In Wilkes-Barre, she spoke under the auspices of the Pennsylvania Association for the Blind.

In order to obtain records of children enrolled in the Maryland School for the Blind, C. Edith Kerby, statistician, made a trip to Baltimore, Md. Dr. Anette M. Phelan, associate in education, continuing her extended field trip throughout the West, has visited the following colleges and universities: the state teachers colleges of Fresno, Calif., Greeley, Colo., St. Cloud, Minn., and Billings, Mont.; Eastern Montana Normal School, Billings; Cornell University, Saratoga, N. Y.; and the University of Washington, Seattle.

The Institute on Eye Hygiene, conducted by the Society's associate for nursing activities, Mrs. Francia Baird Crocker, and supervised by Dr. Willis S. Knighton of New York City, was completed with great success. Representatives from the following agencies attended the meetings: Society for Prevention of Blindness, Washington, D. C.; State Department of Health, Minneapolis, Minn.; Department of Education, Albuquerque, N. M.; Eyesight Conservation Committee, Brooklyn Health Council, Brooklyn, N. Y.; Public Health Nursing Association, Pittsburgh, Pa.; Vermont Department of Public Welfare, St. Albans, Vt.; Washington Department of Social Security, Division for the Blind and Prevention of Blindness, Olympia, Wash. Fifteen other agencies sent representatives to special lectures, and the aggregate attendance for the month was 996.

Current Articles of Interest

Studies on the Infectivity of Trachoma: IV. On the Bacteria Cultivable from Trachoma and Clinically Similar Conditions, R. W. Harrison, Ph.D., and L. A. Julianelle, Ph.D., *American Journal of Ophthalmology,* February, 1936, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. A study was made of the bacteria cultivable from trachoma and clinically similar diseases as well as from normal eyes. It was found that the bacteria cultivable from trachoma are not typical of that infection since they are also recoverable in approximately similar frequency for other conditions of the eye. While less numerous, the same bacteria may be isolated from the eyes of normal individuals. The bacterial flora of trachoma does not vary with the different clinical stages of the disease nor with the presence of epithelial-cell inclusions. Inoculation into susceptible monkeys of all the different varieties of cultures isolated, either individually or pooled, does not induce experimental trachoma even though the tissues from which the bacteria are derived are demonstrably infectious. The observations made in the study furnish no evidence, therefore, that any of the bacteria cultivable from trachoma induce the experimental disease in monkeys.

Allergy of the Eye, Ear, Nose and Throat, Leon Unger, M.D., *Illinois Medical Journal,* January, 1937, published monthly by The Medical Profession of Illinois, Oak Park, Ill. The author lists the following conclusions: (1) The eyes and the upper respiratory tract are especially prone to the disturbance of hypersensitivity; (2) early recognition of possible allergy of the eye may prevent corneal ulcers and subsequent opacities; (3) Ménière's disease is probably allergic; (4) the study of nasal secretions in nasal cases should be routine. A high percentage of eosinophiles indicates allergy, and treatment in such cases should be from both rhinological and allergic points of view; (5) the best treatment for hay fever is a series of injections of the appropriate pollen extracts; (6) the value of nasal ionization is still under dispute; its results

in pollen hay fever usually are not good; in vasomotor rhinitis some workers report considerable success.

Congenital Syphilis of the Eye: A Clinical Study, V. E. Lennarson, M.D., and P. C. Jeans, M.D., *American Journal of Syphilis, Gonorrhea and Venereal Diseases,* January, 1937, published monthly by The C. V. Mosby Company, St. Louis, Mo. The records of a group of 247 syphilitic infants and children are reviewed with special reference to syphilitic lesions of the eye and to the relation of these lesions to the Wassermann reactions in the blood and cerebrospinal fluid.

Special examinations of the eyes were made in 58 per cent of the patients. It was found that of the entire group 38 per cent, and of those who had special examinations 66 per cent, have eye lesions attributable to syphilis.

The incidence of keratitis among all the children over two years of age was 43 per cent, with a maximum frequency of 57 per cent at eight years.

Chorioretinitis was found in only one infant. It was present in 6 per cent of the entire group of older children and in 13 per cent of those whose fundi were examined.

Optic atrophy was present in one infant. It was found in 4 per cent of the entire group of older children and in nearly 6 per cent of those whose fundi were examined.

Among the children two years of age and over, the Wassermann reaction of the cerebrospinal fluid was positive in an equal proportion of those with and those without syphilis of the eye. Among the patients with keratitis, the cerebrospinal fluid was positive with definitely less frequency than among the group as a whole.

The Development of Modern Methods of Estimating Refraction, W. B. E. McCrea, M.B., B.Ch., D.O.M.S., *The British Journal of Ophthalmology,* March, 1937, published monthly by Geo. Pulman & Sons, Ltd., London, England. The story of the growth of refraction is told up to 1870. "The use of lenses for the correction of refractive errors," states the author, "is of great antiquity, but it is only within the last hundred years that any real progress towards the exact correction of ametropia can be said to have taken

place." The article, therefore, deals chiefly with the research and work of the ophthalmologists of the nineteenth century.

A Study of 288 Patients Examined with the Ophthalmo-Eikonometer, Conrad Berens, M.D., *The British Journal of Ophthalmology,* March, 1937, published monthly by Geo. Pulman & Sons, Ltd., London, England. A study of 288 patients revealed no apparent significance in the age or sex of the patients for whom iseikonic lenses were prescribed. However, the percentage of females was slightly higher than the percentage of males. The ages of the majority of the patients ranged from 25 to 40.

Apparently, it is concluded, there are no pathognomonic symptoms which are complained of by patients with aniseikonia or which seem to be relieved by wearing iseikonic correction. The most typical symptoms which seem to be relieved are asthenopia and headaches, especially when these symptoms are aggravated by reading.

In this series of cases, there seemed to be a tendency for the smaller image to be in the right eye and for the differences to be found more frequently in the horizontal than in the vertical meridian.

Apparently, there was definite relief of symptoms in 68.7 per cent of the 160 patients who wore iseikonic lenses, and half of those who reported improvement of symptoms had marked or nearly complete relief.

At present it is impossible to determine whether the factor which is measured with the ophthalmo-eikonometer and corrected by iseikonic lenses is aniseikonia alone.

The author concludes with the statement that much scientific research and many hundreds of clinical experiments with careful statistical analyses must be carried out before the exact place of aniseikonia in causing ocular symptoms can be conclusively evaluated.

The Results of Corneal Transplantation, J. W. Tudor Thomas, D.Sc., M.D., M.S., F.R.C.S., *British Medical Journal,* January 16, 1937, published weekly by the British Medical Association, London, England. An account of the results of corneal transplanta-

tion as carried out by ophthalmic surgeons in recent years is given. The author "feels justified by the results quoted in stating that in suitable cases corneal transplantation has now ceased to be an experiment and is a practical procedure. . . . . The future," he is convinced, "will bring still better chances of success for the suitable cases, and there is some justification for the view that, with a continuance of earnest effort, it will become possible to do a great deal more for many of those cases now classified as unfavourable."

Importance of Aniseikonia, Edward Jackson, M.D., *American Journal of Ophthalmology*, January, 1937, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. The really important facts brought out by recent investigations of aniseikonia, says Dr. Jackson, are these:

Correcting glasses placed before the eyes change the sizes and forms of retinal images. Such changes require changes in cerebral associations of the visual process. Such a process of physiologic adaptation is necessary with each important change in correcting glasses. Our patients should be warned that such disturbances of vision may result; that time should be allowed to effect the change of cerebral associations before they expect full service from the new association of eyes and glasses; that "getting used to glasses" is a real and necessary process, important enough to justify giving it the necessary time and attention; and that the prescribing and selling of glasses are of service to the patient only when the physiologic adaptation to them has been secured.

Surgical Results in 223 Cases of Heterotropia: Especial Reference to Orthoptic Training, Conrad Berens, M.D., *American Journal of Ophthalmology*, March, 1937, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. The author draws the following conclusions:

1. Of 49 patients (Group I) with varying degrees of esotropia and exotropia, some of whom had alternating strabismus and who received no orthoptic training preoperatively or postoperatively, only 6 per cent became heterophoric postoperatively. Heterotropia persisted in 94 per cent of the patients.

2. Of 85 patients (Group II) with varying degrees of esotropia and exotropia, some of whom had alternating strabismus and who were given orthoptic training postoperatively, heterophoria was present in 32 per cent (some degree of binocular vision was found in 61 per cent).

3. Of 89 patients (Group III) with varying degrees of esotropia and exotropia, some of whom had alternating strabismus and who received preoperative and postoperative orthoptic training, heterophoria was present in 49 per cent (73 per cent had some degree of binocular vision).

4. By combining Groups II and III, it is evident that heterophoria following surgery and orthoptic training was present in 70 patients (40 per cent); heterophoria for distance or near in 11 patients (7 per cent); heterotropia persisted in 84 patients (48 per cent); and there was no record of whether heterophoria or heterotropia was present in 9 patients (5 per cent).

5. Forty-seven (70 per cent) of 67 patients with alternating esotropia or exotropia developed some degree of binocular vision.

Twenty-nine (75 per cent) of 39 patients who developed alternating squint between the ages of one and four years had some degree of binocular vision following treatment. Prior to operation only 12 patients were known to have had some degree of binocular vision.

Seven of 8 patients who had strabismus before the age of one year developed some degree of binocular vision.

6. That orthoptic training may be important in the development of normal retinal correspondence postoperatively is suggested by the fact that 25 per cent of 126 patients with heterotropia had false projection and following orthoptic training the number was reduced to 10 per cent.

7. Correction of aniseikonia seemed to be a factor in aiding fusion in two of six patients with alternating esotropia.

8. Of 85 patients with amblyopia, improvement in vision apparently occurred in 53 eyes (62 per cent).

Requirements of Good Desk Lighting, C. E. Ferree, Ph.D., and G. Rand, Ph.D., *American Journal of Ophthalmology*, March, 1937, published monthly by the Ophthalmic Publishing Company,

St. Louis, Mo. The following features are presented as being necessary for a satisfactory desk lamp:

1. Adequate intensity of light should be provided, also a means for varying intensity to suit individual needs and different types of work without changing the color and composition of the light or the size, shape or location of the illuminated area.

2. The unit itself should be glareless when used with lamps of either low or high wattage.

3. It should be placed at a sufficient height to give a wide field of illumination. This spread of light can be increased by certain provisions in the construction of the unit, such as are described.

4. The light should be well diffused and evenly distributed on the plane of work and there should be a well-balanced placement of light and brightness in the field of view. For securing this latter condition, an upward component of light is an important factor in addition to the complete elimination of glare from the lighting unit itself.

5. Glare on the work should be reduced to a minimum. Diffusion of light and height of unit above the plane of work are important factors in securing this result. The most effective means for eliminating glare on the work, however, is a suitable provision for varying the placement of light.

6. The light should be made to approximate daylight in color and composition. For many eyes, particularly in certain pathologic conditions, this is almost imperative.

The Glaucoma Clinic of the Herman Knapp Memorial Eye Hospital, Mark J. Schoenberg, M.D., and Benjamin Esterman, M.D., *Archives of Ophthalmology*, April, 1937, published monthly by the American Medical Association, Chicago, Ill. The authors state that their one year's experience with the glaucoma clinic of the Herman Knapp Memorial Eye Hospital has taught them that such a clinic is fulfilling an urgent need, that it is in step with the spirit of modern clinical medicine, that it is bound to serve the best interest of the patients and of the community by preventing blindness whenever possible and that it offers opportunities for research unequaled by the average ophthalmic clinic.

It is their firm belief that progress is possible if the problem of

glaucoma is attacked by: a systematic and intensive medical as well as ophthalmologic study of each patient with glaucoma; making a thorough survey of the glaucoma material in the ophthalmic institutions of the metropolitan area; establishing a glaucoma clinic in each ophthalmic institution; organizing an association of glaucoma clinics.

Examination and Care of the Eye in Relation to Lighting, C. E. Ferree, Ph.D., and G. Rand, Ph.D., *Archives of Ophthalmology*, January, 1937, published monthly by the American Medical Association, Chicago, Ill. In summarizing their article the authors point out that in comparison with other branches of medicine the development and use of hygienic measures in the care and treatment of the eye seem to have suffered retardation. Like any other organ of the body, the eye, if it is to remain healthy or to cure itself of any of its ills, congenital or acquired, must first be put into a situation calling only for the healthy exercise of its normal functions. Important factors in this situation are the conditions under which it is ordinarily called on to work, two important aspects of which are the type of work and its illumination. Of these aspects, the latter is the more amenable to variation and control. They believe that the prescribing of light to meet the requirements of the individual person has become a practical possibility, and that when properly used it will be of significant service in the care and treatment of the eye. The need for it is acute in the case of many of the patients who come under the physician's care. They point out that this is a new division of the subject of lighting which has been created and which belongs in its narrower and more technical aspects to the medical profession and in its broader and more general aspects to the welfare and personnel worker.

Prognosis of Postoperative Sympathetic Ophthalmia: A Statistical Study, Harold H. Joy, M.D., *Archives of Ophthalmology*, April, 1937, published monthly by the American Medical Association, Chicago, Ill. This study, based on 103 cases of postoperative sympathetic ophthalmia, brings out several points worthy of notice. The final visual results indicate that the prognosis of postoperative

sympathetic ophthalmia is not necessarily as unfavorable as many authors have stated, provided proper treatment is instituted with promptness. The final outcome in the cases in which the condition followed combined extraction of senile cataract was less favorable than in those in which it followed other intraocular operations. The inflammation in the sympathizing eye was disproportionately more severe than that in the exciting eye in three cases of sympathetic ophthalmia due to extraction of cataract in which the diagnosis was confirmed and three cases of the same kind in which the condition was clinically diagnosed. However, this was not apparent in 12 cases in which the condition was clinically diagnosed in which neither eye was enucleated. There is no indication that sympathetic ophthalmia due to iridectomy for glaucoma is particularly rare or that its course is mild. The results in the few instances in which secondary operations were performed indicate that the exciting eye tolerates surgical intervention well and that the sympathizing eye can often be safely operated on if it is properly prepared for the intervention.

Book Reviews

TRACHOMA. A. F. MacCallan, C.B.E., M.D., F.R.C.S. London: Butterworth and Co., 1936. 225 p. Ill.

The author is one of the most prominent authorities in the field—president of the International Organization against Trachoma; consulting surgeon to the London Royal Eye Hospital and other institutions, and formerly director of ophthalmic hospitals of the Egyptian Government. His work in Egypt—"the cradle of trachoma"—added to MacCallan's well-deserved fame. He advised the Government and planned the ophthalmic hospitals from 1900 to 1923, so that in 1934 somewhat less than a million new patients were received in them. The splendid Memorial Ophthalmic Laboratory at Giza, now so ably directed by Dr. R. P. Wilson, is said to owe its existence to MacCallan.

The treatise comprises reviews of the history, causation, epidemiology, pathology, clinical course and treatment of trachoma. Apart from this and more important is the fact that his personal observations, especially derived from experiences in Egypt and in England, are threaded through the volume. The book is therefore of value to the ophthalmologist and to those interested in the prevention of blindness, for this disease is a major cause of blindness in trachomatized countries.

The historical section deals mainly with the origin and spread of trachoma in Egypt. It is noteworthy that MacCallan believes that the disease arose among the nomad races of Mongolian plains and spread West with Mongol invasions until it reached the Mediterranean littoral, where it was most widely disseminated. Eastward it traveled through China and Siberia and reached, through migrations, the American continent, where it infected the American Indians.

In the section on etiology, the different theories and experimental evidence are brought into view, especially the recent work of Thygeson on an ultramicroscopic virus as the causal factor. The work of Julianelle, of Washington University, in this connection is, however, omitted. The chapters on clinical appearance and

diagnosis are complete, with stress being laid on the four clinical stages of the disease (the well-known MacCallan's classification). The writer maintains the local character of this affection and the fact that in trachomatized countries it is an infantile disease (infection occurring almost always before the age of two years). The use of the slit lamp and biomicroscope for diagnosis is advised. The complications and sequelae of trachoma and its differential diagnosis are described in full.

MacCallan expresses his debt to Dr. Pulvertaft for histopathological details, and emphasis is laid on the early, generalized, subepithelial lymphocytic invasion and the fact that the follicle may then be absent. Of interest in the epidemiological section is the description of the geographical distribution of trachoma. Treatment is considered both from the points of view of prevention (personal, familial, institutional—schools—naval and military, national and international) and of alleviation of symptoms of the disease and its complications by medical and surgical procedures.

PETER K. OLITSKY, M.D.

STRABISMUS. A. Cantonnet, M.D., and J. Filliozat, M.D. London: M. Wiseman and Co., Ltd., 1936. 329 p.

This well-bound and legible book by two French authors concerns itself with the re-education of binocular vision in strabismus. It should be studied carefully by every honest student for it will give pause to the skeptics of orthoptic training. Chronic operators will find little comfort in the ideas presented. The authors feel that in strabismus "it is more elegant to untie the Gordian knot than to sever it; we must obviously sever it if it cannot be untied, but it must be untied if this is possible."

The book is divided into three parts. Part I discusses the physiology of binocular vision and includes many tests for the measurement of binocular vision and stereoscopic vision; Part II discusses the pathology of binocular vision; and Part III, which may be considered the main reason for the book, develops the re-education of squinters according to the authors' ideas. The reader will undoubtedly disagree with many of the tenets of the authors but he cannot fail to be impressed with the thoroughness and care of the presentation. The question of strabismus and its

non-operative treatment is a moot one and this book should be on the "must" list of every serious worker.

WILLIS S. KNIGHTON, M.D.

AIDS TO OPHTHALMOLOGY. N. Bishop Harman, F.R.C.S. Eng. Baltimore: Wm. Wood and Co., Eighth Edition, 1935. 242 p. Ill.

This book by a well-known English author contains excellent material for the doctor who wants his ophthalmology in brief. The fact that it has run through eight editions attests to its popularity. All phases of eye work are touched upon, including bacteriology and operations. At the end of the book are tables for standards of vision of various English military and educational services. The book contains over two hundred pages of descriptive matter and line drawings. It is an excellent introduction to ophthalmology for the medical student but it should not be considered a complete textbook for an eye man. It is unfortunate that the type is so small as to be annoying.

WILLIS S. KNIGHTON, M.D.

THE EXTRA-OCULAR MUSCLES: A CLINICAL STUDY OF NORMAL AND ABNORMAL OCULAR MOTILITY. Luther C. Peter, A.M., M.D., Sc.D. Philadelphia: Lea & Febiger, 1936. 351 p. Ill.

This work bids fair to assume the proportions of a standard. Its popularity is certainly growing. The reviewer feels that this is due to the fact that the descriptions and arrangement render the work very understandable. The illustrations are particularly fine. They have been well selected from the literature, and original drawings and photographs make the work most appealing. The reviewer would like to see a somewhat broader discussion of current theories, the author having emphasized his own views and experiences somewhat at the expense of other generally accepted ideas.

We hope to have the pleasure of reviewing many editions of this work, as it is most deserving of a permanent place in ophthalmic literature.

JOHN N. EVANS, M.D.

WILLS HOSPITAL EYE MANUAL FOR NURSES. G. E. Cole. Philadelphia: W. B. Saunders Co., 1936. 202 p. Ill.

Primarily a text on ophthalmic nursing, this volume gives, in detail, nursing procedures in caring for eye patients.

The chapter on orthoptic training is very brief, only about seven pages, including several illustrations. While the subject is comparatively new for the nurse to consider, it is doubtful whether the chapter will be of very much use to public health nurses in helping them to understand which cases need training and the reasons for the procedures outlined.

Public health nurses who have had very little, if any, experience in caring for eye patients might find the book helpful in enlarging their vocabulary (there is a good glossary attached), and of use if an eye patient is to be taught how to follow the ophthalmologist's instructions in his home.

FRANCIA BAIRD CROCKER, R.N.

Briefer Comment

THE MANAGEMENT OF THE NEWBORN BABY: A GUIDE FOR MIDWIVES. Alan Moncrieff, M.D., F.R.C.P. London: Association of Maternity & Child Welfare Centres, 1936. 48 p. Ill.

This booklet, which can easily be carried in a pocket, gives detailed instructions in clear and simple language for each step in the care of the mother and newborn baby immediately before, as well as after, the birth of the child. The importance of instilling silver nitrate solution into the baby's eyes immediately after birth is stressed, and the detailed instructions are illustrative of the manner in which each step in the care of the mother and child is outlined.

PERKINS INSTITUTION AND MASSACHUSETTS SCHOOL FOR THE BLIND, ONE HUNDRED AND FIFTH ANNUAL REPORT, 1936. Watertown, Mass. 80 p. Ill.

The well co-ordinated report of Perkins Institution might have been entitled "Looking Ahead," since it stresses the expanding program of the Institution and the urgent and immediate needs which call for new facilities and new sources of income. Provision must be made for educating triply handicapped children—those who are deaf, blind and without the power of speech; facilities must be found for training blind mentally retarded children who are unable to pursue the present program satisfactorily; and it is hoped that income which is not designated for educational purposes may be made available to provide physical and psychiatric care, as well as to promote other projects.

Yearbook of The New York Institute for the Education of the Blind, 1936. New York, N. Y. 73 p. ill.

The illustrated 1936 Year Book of the New York Institute for the Education of the Blind is interesting and valuable not only for the reports of the board of managers and the principal, but for the general information which is given. The schedule of classes for the upper school and the program of the anniversary exercises help to create for the reader a mental picture of the life of the school.

The Mechanism of Accommodation. Edgar F. Fincham, F. Inst. P. London: George Pulman & Sons, Ltd., *British Journal of Ophthalmology*, Monograph Supplement VIII, 1937. 80 p. Ill.

The author summarizes his points of evidence that accommodation is brought about by a reduction in the tension under which the lens is suspended, as follows:

1. The anatomy of the ciliary muscle points to the conclusion that its inner portion will act as a form of sphincter muscle, so that in contraction the ciliary corona from which the lens is suspended by the zonule will be reduced in diameter.
2. This conclusion is verified by the records of the movements of the inner edge of the ciliary body in a case of aniridia.
3. The lens is displaced in the direction of gravity during great efforts of accommodation; its position is not affected by gravity in the unaccommodated state.
4. In the case of the eye with the empty lens capsule, the difference between the tautness of the capsule in the unaccommodated state and its slackness during an effort of accommodation, can be accounted for only by the relaxation of the tension under which the capsule is held.
5. In the dissection of the eye of a child in which the lens was found to be in the unaccommodated form after the removal of the cornea and iris, the anterior surface of the lens assumed a form consistent with an accommodation of 14 diopters when the suspensions of the lens were severed.

Organized Safety by Organized Parents and Teachers: Traffic Safety Education Project of the National Congress of Parents and Teachers. New York: National Congress of Parents and Teachers, 1936. 16 p. Ill.

Assuming its responsibilities in the education of the public on the subject of organized safety by parents and teachers, the National

Congress of Parents and Teachers issued an attractive and arresting bulletin dealing with the following topics: the traffic problem; personal responsibility of the members for traffic safety; traffic problems of particular interest to parent-teacher members; parent-teacher co-operation in a school safety program; and traffic legislation of particular interest to parent-teacher members — the standard license law.

READING READINESS—A PROGNOSTIC STUDY. Wendell William Wright. Bloomington, Indiana: School of Education, Indiana University, Bulletin, Vol. XII, No. 3, 1936. 46 p.

Because studies of half-grade promotions made in the past few years have disclosed that in the schools of the United States with mid-year promotions 20 per cent of the pupils in the beginning first grade have had to repeat that half grade, a two-year prognostic study was undertaken, including approximately 400 beginning first grade pupils under normal classroom conditions in the Bloomington, Indiana, public schools. This careful study has been printed with a valuable bibliography and a list of bulletins in the field of education published by the School of Education of Indiana University.

SAFETY THROUGH THE YEAR. Florence Nelson and H. Louise Cottrell. New York: McGraw-Hill Book Co., Inc., 1937. 96 p. Ill.

Accident hazards are presented in a series of brief stories for children. Some questions are brought up for class discussion and others are placed with spaces left blank after them for answers. There are also charts to be drawn and various stories to be written in the children's own words. The attractive make-up and illustrations of this paper-bound book should make it interesting to school children and useful for safety training.

Books Received

ARTHUR SUNSHINE HOME AND NURSERY SCHOOL FOR THE BLIND: TWENTY-SEVENTH ANNUAL REPORT. Summit, N. J., 1937. 24 p. Ill.

BENNETT, WILMA: *Occupations and Vocational Guidance: A Source List of Pamphlet Material.* The H.W. Wilson Co., New York, N.Y., 1937. 124 p.

Current Publications on Sight Conservation

Note.—The National Society for the Prevention of Blindness presents the most recent additions to its stock of publications. Except for the more expensive ones, single copies are sent free upon request. Unless otherwise specified, they are reprinted from The Sight-Saving Review. New publications will be announced quarterly.

237. Prevention of Occupational Eye Accidents, Claude S. Perry. 8 p. 5 cts. Discussion of the measures which will prevent eye accidents and their more serious complications.

238. What Are the Educational Facilities for the Visually Handicapped? Winifred Hathaway. 8 p. 5 cts. Presentation of bases of selection of children for sight-saving classes, together with a plan for how and where the classes should be taught.

239. The Problem of the Cross-Eyed Child, Le Grand H. Hardy, M.D. 8 p. 5 cts. The author outlines the five main steps in the treatment of the cross-eyed child, which requires patience, knowledge, tact and sympathy.

240. The Social Worker in Sight Conservation, Eleanor Brown Merrill. 8 p. 5 cts. In order to have greater concerted social action in safeguarding eyesight, the various threads of community activity which may in any way relate to questions of eye health should be drawn together.

241. Factory Lighting and Accident Prevention, E. W. Murray. 12 p. 10 cts. Specific examples of the need for good illumination in order to relieve the high and unnecessary expenditure of energy which always accompanies a badly designed or glaring installation.

242. What Does the Student of Institutions for the Education of Teachers Know About Eye Health? Anette M. Phelan, Ph.D. 12 p. 10 cts. In giving an exposition of the results of a test taken by 887 students in 12 teachers' colleges, the author explains the need for a more searching form of test.

243. Blindness Prevention, Harry Best, Ph.D. 8 p. Brief statement of national campaign to save sight, mentioning the work of the National Society for the Prevention of Blindness. Reprinted, with permission, from the *Social Work Yearbook.*

244. Don't Abuse Your Eyes, Angelo Patri. 4 p. A few "do's" and "don'ts" for parents who are concerned about their children's eyes. Reprinted with permission of the author and the Bell Syndicate.

D100. Conserving Eyesight, Forrest F. Slyfield, M.D. Reprinted from *National Safety News,* February, 1937. 2 p. A complete program of eye conservation includes protection against injury, correction of errors of refraction, and skilled medical service.

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Eye Conditions Prevalent in the School Age*

Joseph E. Golding, M.D.

THE factors causing defective vision in children of school age may be listed as heredity; prenatal disease; defects in the shape of the eyeball; focal infections; childhood diseases; and accidents, according to the author, who discusses these subjects in this article.

IN order that first things may be set down first it should not be forgotten that some of the eye conditions which we see during school years are due to congenital or hereditary factors and that during this period of life little, in many instances, can be done except to minimize the disability which results. In other instances we are helpless and must direct our attention to the education of the child to the end that he may make the best possible use of whatever visual power remains. This education includes helping him to plan his life work along lines wherein his visual capacity may be used to the greatest advantage both to himself and to the community. It also includes the conservation of whatever vision he has when he comes under observation.

The prevention of the known hereditary conditions rests upon stringent laws and regulations, and their strict enforcement, to prevent the marriage and the begetting of children by the unfit and by those who are known to have, or whose family history indicates that they have, transmissible diseases, or any of the so-called familial diseases. No treatment and no hygienic régime can do other than minimize the damage of interstitial keratitis (a chronic variety of inflammation of the cornea with deep deposits in the substance

* Presented at the Institute on Conservation of Vision, Brooklyn, N. Y., April 16, 1936; arranged by the Bureau of Prevention of Blindness of the Division for the Blind, New York State Department of Social Welfare; and sponsored by the Eyesight Conservation Committee of the Brooklyn Health Council; Medical Society, County of Kings and Academy of Medicine; and the Brooklyn Ophthalmological Society.

of the cornea which becomes hazy throughout and has a ground-glass appearance), for example, which is due to hereditary syphilis. The same might be said for retinitis pigmentosa (inflammation of the retina or structure which records the image seen, marked by progressive hardening of the retina with discoloration and shrinkage) and to a lesser degree of congenital cataracts (an opacity or imperviousness to light rays by the lens of the eye which originated before birth), which have a tendency to appear in succeeding generations, though for the last condition operation for the removal of the cataract offers the hope of better vision.

From all this it is evident that these very deplorable eye conditions cannot be prevented by us nor in many cases can they be successfully treated. The remedy for them lies in a better and more widespread recognition of the possibility of their occurrence and the application of a sound system of eugenics.

Necessity for Good Hygienic Surroundings

Given a good heredity, the child cannot develop normally without proper guidance as to feeding, housing and clothing and the cultivation of good health habits. If we think of the eye, not as a thing apart from the rest of the body—a mere optical instrument like the camera, with which it has many points in common—but rather as a part of a living being, we can not fail to be impressed with the fact that what is good for the body in general is good for the eyes, and what is bad for the body in general is bad for the eyes. With this in mind the need for proper feeding, clothing and housing will impress itself upon us as being quite as essential for the health and proper functioning of the eyes as it is for the general health.

Poorly nourished children, in bad hygienic surroundings, are particularly susceptible to certain forms of diseases of the eyes. For example, I have in mind that about three years ago we had at one of our hospitals more than 100 cases of follicular conjunctivitis (inflammation of the firm inner framework of connective tissue which gives shape to the eyelid) in children of school age all of whom came to us from an institution for children. More or less crowded, as is common in many institutions, they were living a sort of dull routine life as to food, exercise and general environment, which diminished their powers of resistance, and as a result they

fell easy victims to the disease which, happily, was curable and left them with no visual crippling. Under happier environment, with wider variety of food, more attention to ordinary rules and less crowding of the children, this epidemic would not have occurred.

Focal Infections

Disease of one part of the body as the result of an infection in another part is coming to be recognized as common. Affections of the eyes are no exception to this rule and these so-called focal infections are the cause of a variety of diseases of the eye. For example, diseased tonsils, abscessed teeth and infections of the nasal sinuses may not only be the cause of such general conditions as chorea (a convulsive nervous disease—St. Vitus' dance), rheumatism, endocarditis (inflammation of a lining of the heart), etc., but iritis (inflammation of the iris or band of radiating fibers by which the pupil is dilated or contracted), keratitis, scleritis (inflammation of the tough white supporting tunic of the eyeball, covering it entirely except for the segment covered by the cornea), and other eye conditions are often directly traceable to them. It is imperative that the social worker and all interested in the conservation of vision keep these conditions in mind in order that they may be helpful in advising parents regarding them and their potentialities for harm.

Diseases of the Eye

Diseases of the eye occurring in the school age group may be divided into two classes: those showing external signs of inflammation and those exhibiting no such signs. In the latter group the only evidence that disease exists, in many cases, is the impairment of vision.

Diseases accompanied by external evidences of inflammation, to mention only a few of the commoner ones, include diseases of the lids, such as styes and blepharitis (inflammation of the eyelids), and conjunctivitis in its various forms, keratitis, scleritis, and iritis. These are all accompanied by more or less redness, photophobia (abnormal intolerance of light), increased lacrimation (the secretion and discharge of tears), and pain of greater or lesser intensity. Cases of conjunctivitis and keratitis have some discharge from the

eye. Inasmuch as some of these diseases are benign while others are capable of causing great impairment of vision, and the differentiation between them is not always easy, it is imperative that these children be promptly referred to a physician in order that the correct diagnosis may be made and proper treatment instituted as early as possible. A slightly red eye, which to the layman is "just a cold in the eye," may be an iritis which, if not promptly placed under proper treatment, may result in great visual loss. Suggestions that boric acid solution or argyrol or any other remedy be used in such an eye before an accurate diagnosis has been made have had serious results. It is a safe rule to follow to insist that every red eye be seen by a physician as soon as possible to the end that early treatment may be instituted and permanent disability reduced to a minimum.

Conditions not accompanied by evident signs of inflammation include cataract, chorioretinitis, retinitis pigmentosa, retinal hemorrhages, hemorrhages into the vitreous (the semi-fluid, transparent substance which lies between the retina and lens of the eye), and diseases of the optic nerve. Also included in this class are those eye conditions which are secondary to general diseases, such as Bright's disease (inflammation of the kidney), diabetes (a disease marked by habitual discharge of an excessive quantity of urine), and brain tumor. In all these conditions a thorough and complete physical examination of the child to discover the underlying cause should be made and proper treatment prescribed if permanent visual disability is to be avoided. The interest of any child will be best served if the teacher, school nurse or social worker will, on discovering any abnormal eye condition, refer the child to his own family physician. Not only is he familiar with the child's previous medical and eye history, but he is more likely than anyone else to know of the family tendency toward disease, constitutional and otherwise, which might have a bearing on the eye condition. He is, because of this fact, in a position to supply the eye consultant more promptly with facts of importance relative to the child's physical condition.

Mention has been made here of only a few of the eye conditions which affect the eyes of children of school age. Time does not permit mention of all the conditions which may occur at this period

of life, so it might be well to proceed to those conditions which we meet most frequently and which present some of our greatest problems. I refer to refractive errors so commonly met with in school children either associated, or not, with muscular anomalies. Quite aside from the question of strabismus (squint, or crossed eyes) there are many children with defective vision in whom the defect is never noticed until the child's vision is recorded by the teacher or school nurse. These children have deceived themselves and their parents by squeezing their lids together in order that they might get clearer vision and thus the condition has passed unnoticed. Incidentally, a visual acuity of 20/20 in each eye does not mean very much except that the child has vision which comes up to a somewhat arbitrary standard, for these children may, in many instances, be suffering from definite eye symptoms despite their 20/20. Many of them, indeed, are greatly in need of glasses to give them comfortable vision; and this is, of course, essential if they are to do good school work and if they are not to put too great a strain upon their eyes during this period of their development.

Refractive Errors

If we now pass to the refractive errors, those conditions which will be benefited by the wearing of glasses, we find that they are divided roughly into three main groups: (1) hyperopia or farsightedness; (2) myopia or nearsightedness and (3) astigmatism.

Just to simplify we may say that hyperopia, or farsightedness, is that condition in which the child may or may not see distant objects well but he has difficulty in maintaining a distinct image of small objects for a long time. Here the image of the object is focused at a point behind the retina, and only by a great effort of accommodation can a clear image be had. As a result of this accommodative effort headaches and other symptoms of eye-strain develop. In myopia, on the other hand, vision for distant objects is greatly impaired but objects held close to the eyes are distinctly seen. Here the image focuses in front of the retina and efforts at accommodation would only make matters worse; hence no such effort is made and myopes, for this reason, suffer much less than do hyperopes from headaches. Astigmatism, or astigmia, is that condition in which the cornea or lens, or both, have different refractive

power in different meridians. One meridian may be emmetropic and another, hyperopic or myopic; or any combination of these may exist. Depending upon whether the astigmatism is myopic or hyperopic, the image will be focused either in front of or behind the retina.

Hyperopia.—This is the condition existing in all human eyes at birth. It may be said to be congenital and in its higher grades it is often hereditary. The tendency is for hyperopia to diminish gradually as the child grows older. Hyperopia is always accompanied by excessive accommodation in order that the image may be focused on the retina. Farsighted eyes are shorter from front to back than normal eyes. This excessive accommodation causes eye fatigue, headaches, and finally blurred vision when the accommodation relaxes entirely from overwork.

The association of accommodation with convergence readily explains why so many of these hyperopic children are cross-eyed. Despite the fact that the mother of the child insists that the eyes crossed following a fall or an acute illness, we believe that there is little or no causal relationship. Every child falls at some time or other, but not all of them, not even the hyperopes, develop a squint. Excessive accommodation, accompanied as it is by excessive convergence, is the prime factor in the production of this condition. In the beginning the squint may be noticeable only when the child is tired late in the day. Cases such as have been described are in most instances relieved of their strabismus if, by the wearing of proper glasses, the accommodation is sufficiently relaxed. It is essential that in the examination of these children the muscles of accommodation be fully relaxed before the refraction is done. This is accomplished by the use of atropine, or other similar drug, which has the property of dilating the pupil and paralyzing, temporarily, the accommodation muscles. Even after the correction of the vision by glasses it will be found in many cases that the vision is subnormal in one or the other eye. This defect will be found in the eye which was in faulty position before the glasses were prescribed. The eye which is in a position of excessive convergence is for the time being temporarily out of use and, therefore, according to one school of thought, its vision fails because of disuse, much as an arm which has been put into a splint is helpless for a long time after the

removal of the splint. Another school of thought insists that the vision in one eye was primarily poorer than that of the other and that the squint develops as a result of this condition. They support their contention by pointing out that eyes with corneal maculae which seriously impair the vision are prone to wander from the primary position. Whichever of these schools is correct, the fact remains that in cases of concomitant squint the vision is poorer in the squinting eye than it is in its fellow excepting only in cases of alternating squint in which either eye fixes alternately. Nurses, social workers and others interested in this problem will save oculists headaches and parents much money if they will remember that in many of these cases the vision in one eye cannot be brought up to normal.

When the eyes can be brought to a parallel position by the use of glasses, operation for the correction of the squint is not necessary. Occasionally when glasses do not have the desired effect, resort may be had to operation upon one or more of the ocular muscles. Parents and children should be impressed that operation for the cure of squint is purely a cosmetic measure and is without effect in improving the vision.

Myopia.—If the natural tendency for hyperopia to diminish in degree is carried too far, myopia, or nearsightedness, will develop. In the normal development of the eye, as has been stated, hyperopia tends to be reduced as time goes on and by a diminution of the hyperopic reserve, the condition goes over into myopia. As the eyeball elongates in its anteroposterior diameter, the refraction becomes less hyperopic, but in most persons a normal hyperopic reserve is maintained. It is only when the elongation of the eyeball goes too far that myopia develops. Other causes of myopia are corneal opacities, keratoconus, astigmatism, and heredity. There appears to be a racial tendency to myopia, especially in the Jewish people, in whom it is said that myopia is 40 per cent more frequent than it is in others. Statistics show that twice as many boys as girls are afflicted with myopia, but that the highest degree occurs in girls—also that most of the myopia seen in school children existed before they entered school. Be that as it may, it is certain that it progresses mostly during school years. It is, therefore, very important that nearsighted children be examined frequently, re-

cording results on a chart or graph showing whether their myopia is progressing rapidly or not, so that a proper regimen for their eyes may be prescribed. It is generally conceded that visual capacity rather than visual acuity should be our guiding star in the care of these children. Myopia is not the direct antithesis of hyperopia because it may be accompanied in its later stages by distinct organic changes in the structure of the eye. As the eye elongates the retina and choroid are stretched and in some cases actual tears appear in the retina which are later followed by retinal detachment, a most serious accident. Muscular anomalies occur in myopic eyes, just as they do in the hyperopic, only here, since the accommodation is largely in abeyance, the tendency to converge is reduced to a minimum; where either eye assumes an abnormal position, it is usually in a position of divergence.

Treatment of this myopia should first of all be directed at the correction of the refraction by glasses. There should be a minimum amount of near work required. Outdoor exercise, by stimulating the activity of the suprarenal glands, is credited with retarding the progress of myopia. A correct position of the body and head during study, through the use of proper desks and seats of proper height, is considered important by some authorities. The use of books with type of a size easily read is desirable, and well-diffused illumination, coming from a source behind the child, is advisable. Perhaps as important as any of these is a proper restriction of the hours of study. Operation for the cure of myopia by removal of the crystalline lens from the eye has been advocated but is done rarely—only for the very high degrees. All cases of myopia should be examined three times a year and glasses changed as often as seems indicated.

As a conclusion to this discussion of myopia may I quote from the writings of Dr. Avery Prangen, of the eye department of the Mayo Clinic, as follows:

1. Myopia is an abnormal tendency to reduce the hyperopic reserve normally seen in children.

2. This abnormality is seen in both hyperopes and myopes, but it is troublesome only to the myopes.

3. This process may become arrested at any time, or continue unchecked.

4. Myopia is the result, not the cause, of this difficulty.

5. An hereditary tendency, together with age, is the chief factor. The importance of all other factors is debatable.

6. Constant wearing of fully correcting lenses is important.

7. Periodic examinations to keep the correction apace with any change in the myopia are a necessity.

8. General hygienic and dietary measures are indicated.

9. Restriction of unnecessary near work seems sensible.

10. Progressive myopia of the malignant type is rare. Its management and care are individual problems.

Astigmatism.—The third important refractive error which should be considered is astigmatism. Here the refractive power of the eye is different in different meridians, and glasses to correct one or more of the meridians at fault are prescribed for its correction. In this condition some of the rays of light entering the eye may fall on the retina or in front of or behind that structure, and, since they do not come to a focus on any one point, indistinct vision results and symptoms of eyestrain develop. Astigmatism may be regular or irregular. The former type may be corrected with cylindrical glasses but the latter is very difficult of correction except with contact lenses. This type of refractive error may also be classified as hyperopic, myopic and mixed. Excepting only contact glasses, all lenses for the correction of astigmatism must be adjusted at the proper axis if clear and comfortable vision is to be obtained. Any bending of the frame or turning of the lens in its rim will throw the lens off its axis, and discomfort will result. For this reason it is important that such glasses be taken frequently to the optician for adjustment.

Eye Injuries

The most common causes of injuries to the eyes are foreign bodies in the cornea, the common B B shot injuries from an air-rifle or bean-shooter, injuries from fireworks, and those from chemical caustics. Here, if ever, is it true that "an ounce of prevention is worth a pound of cure." Many eyes are lost annually because of fireworks and B B injuries alone. Perhaps a few examples will make this statement more impressive. About five years ago a fine boy of about 14 years of age was curious to know what would happen if he placed a lighted firecracker under an ordinary tin can,

so he tried it. The can did not go straight up in the air as he had expected, but instead it struck one of his eyes damaging it beyond repair. We tried for several days to save the injured eye, but this proved unsuccessful and the eye was enucleated. Despite this operation he developed sympathetic ophthalmia in the other eye three weeks after he left the hospital. He was again hospitalized and the second eye treated. The result was that this eye was saved, but with vision which amounts to only about 20/200. Another instance of a different nature, but none the less tragic, concerns a girl of about 10 years of age who, while sitting on the porch of her home, was struck in one eye by a B B shot from an air-rifle in the hands of a neighbor's boy. The iris was torn away from its attachment to the ciliary body, and within a few days there was present a traumatic cataract. After operation for the cataract she had a corrected vision of 20/40, but now, 12 years after the injury, the pupil is filled in by a dense membrane and she has no useful vision in that eye. In addition, the injured eye is in a position of noticeable divergence, and this constitutes a very marked cosmetic defect in a rather attractive young woman now 22 years of age. These two examples of preventable eye accidents emphasize the need for laws and regulations outlawing dangerous playthings.

Injuries resulting from chemical caustics entering the eyes are seen not uncommonly in the chemical laboratories of our high schools and colleges, as a result of poorly planned and poorly executed chemical experiments. The results in some cases are extremely disastrous. Free flushing of the eye with quantities of water and the application of a cold, wet, clean compress should be immediately followed by sending the child to a physician.

As the injuries here enumerated seem bound to happen, it is incumbent upon those who see them first to meddle with them as little as possible. No attempt should be made to remove foreign bodies with a knife, toothpick or other handy object. Such eyes should be kept clean, a sterile or at least a clean dressing applied, and the child sent to a physician. If the eyeball itself has been injured, cleanliness again is the watchword. Do not handle such eyes more than is necessary to apply a clean dressing and bandage to keep it in place, being careful not to have the bandage exert any pressure upon the eye lest some of the contents of the globe be lost.

Motor Vision in Safe Driving*

Alvhh R. Lauer, Ph.D.

THE author lists the following eye defects as contributing to motor accidents: reduced acuity, muscle imbalance, reduced field of vision, ocular dominance, blinding from glare of headlights, poor distance judgment, scotomata, and general inattention in driving as brought on by eyestrain.

The Problem

FEW people realize the seriousness of our accident problem. It is the greatest single menace to the public health and welfare today. This fact is magnified when we consider that the victims are usually in the pink of physical condition. It is a scourge which strikes the strong instead of the weak. More than 37,000 fatalities last year! Nearly a million injured, with no provision made for pensions, adjusted compensation, or benefits otherwise. Our hospitals are crowded with the victims, many of whom will die prematurely from injuries sustained or will go through life maimed. No other one cause of human suffering is receiving so little scientific attention as the problem of safety. A few of us who have attempted to carry on scientific research have found it very difficult to secure the funds to conduct the needed studies in order to obtain results necessary for valid conclusions. Every year we have had to expend personal funds to accomplish even temporary objectives, and at present many studies completed have not been published because of lack of money to make such publications available. The studies which have been carried out to date have been made possible largely by the generosity of the American Optometric Association. Various colleges and research agencies have aided, but the work was pioneered by that Association. It is for this

* Radio address delivered over Station WTIC January 18, 1937.

reason that I am very happy to give you a general bird's-eye view of the studies which were begun at the Ohio State University nearly ten years ago. The results will be emphasized only in a general way. Later I shall give you more of the detailed results.

Why Do People Have Accidents?

One of the things we have learned during the past ten years is that accidents do not "just happen." It is unfortunate that the term accident came to be used in this connection. A term like wreck, collision, or crash would be much more appropriate. We do not speak of train accidents—we speak of train wrecks. It is generally conceded that a reason for the wreck may be assigned. Either the engineer missed a signal, a dispatcher made a mistake, a yardman left a switch open, or there was some definite mechanical defect in the equipment. It was not merely a turn of fate which was entirely unavoidable. Even mechanical failures may be traced to poor train inspection.

Types of Accidents

A study of automobile crashes reveals a number of types of accidents. This is one point which the amateur safety enthusiast overlooks. To describe a few types of accidents—we are forced to use the term from precedence—will suffice to illustrate:

1. Those which happen at intersections:
   a. One car turns across the path of another going in the same or opposite directions.
   b. One car runs across the path of another moving at right angles to it.
2. Those which happen on the straight-of-way between intersections:
   a. One car pulls across the path of another going in the same or opposite directions.
   b. One car is struck directly from the front or rear by another.
   c. One car fails to keep on the road due to mechanical failure, insecure traction, or failure of the driver to maneuver properly.

3. Those which occur from vehicles moving down a hill from a standing position through sheer force of gravity.
4. Those in which pedestrians are struck.

It is quite certain that no one wants to have a crash in which he will lose money, time, his social standing, and perhaps even his life. Estimates by the National Safety Council place the blame for from 85 to 90 per cent of accidents on the driver. Yet we know that a man in his right senses will not deliberately expose himself to unnecessary danger. If a maniac were running at large who would shoot anyone on sight, the streets would soon be evacuated except by those whose duty demanded apprehension of the individual. Few people would submit themselves to a scientific experiment which might possibly bring death. Yet men and women drive like mad on dangerous highways and flirt with death at every unguarded intersection. Many drivers are like ostriches. They feel that as long as they see no danger—in the form of cars or road conditions—such dangers do not exist. It is an established fact that more automobiles are driven deliberately into trains at crossings than there are trains which strike automobiles on the track.

The point I wish to make is that there are relatively few general types of accidents and that drivers do not wish for crashes. Collisions with cars or objects take place only because the driver fails to do one of three things:

1. Sense dangerous situations, namely, become aware of their presence so far as the physical data are concerned.
2. Interpret properly the situations which he does sense.
3. Control his vehicle in such a way as to avoid dangerous situations which arise because of, or in spite of, failures 1 and 2.

It is fair to say that 85 to 90 per cent of accidents come under one of the three classes of weaknesses of drivers. Under the first heading are those due to sensory inadequacy. Man has ten senses: smell, taste, pain, warmth, cold, touch, muscle, equilibrium, hearing, and vision. There may be a few, but very few, accidents traceable to the first five mentioned. Touch, the muscle sense, and equilibrium play a part in manipulation, particularly on improperly banked curves. More cars run off the road at curves than slide off or deliberately upset. Either the driver does not have the strength

or action to pull his car around the curve—when traveling too fast—or he misjudges and is led to believe that he is turning over and keeps in a more or less straight line. Poor hearing may be responsible for some accidents, but deaf drivers have been found to be relatively free from accidents, equating for their scarcity.

This leaves vision as the one important sense department in driving. There is some controversy over the amount of vision necessary for safe driving, but there is general agreement that a blind person cannot drive. Since we are here primarily interested in visual aspects of drivers, we shall dispense with most of the other weaknesses of drivers, for the time allotted to the present discussion will not permit a complete account of the various conditions of poor interpretation of stimuli and failure to respond quickly enough to avoid trouble. We shall confine our efforts to a further discussion of visual defects associated with accidents. These may be listed as:

1. Reduced acuity, or keenness of vision, and farsightedness.
    a. Nearsightedness.
    b. Astigmatism.
2. Muscle imbalance or failure of the eyes to align properly.
3. Reduced field of vision for movement.
4. Ocular dominance—the tendency to use one eye more than the other.
5. Blinding from glare of headlights.
6. Poor distance judgment or depth perception.
7. Scotomata or "holes in vision."
8. General inattention and drowsiness brought on by eyestrain.

As suggested before, in addition to vision, there are many other weaknesses of drivers associated with accidents, but certainly everyone should be aware of his visual conditions and how they may lead to trouble. Here are a few of the ways. If you will remember the above classification of contacts between vehicles, it is obvious that many such collisions occur because of the following:

1. Failure of the driver to see or interpret a warning sign or signal in time to stop in order to avoid it.
2. Failure of the driver to determine the exact location of a vehicle, person, or other object in time to avoid collision.
3. Failure of the driver to see objects or persons at night.

So far as vision is concerned, the first classification of failures of the driver may be due to lowered acuity or keenness of vision; restricted field of vision, namely, narrowed down from the sides; scotomata, or "holes in vision," in which part of the field objects will not be discerned; ocular dominance, or the tendency to use one eye more than the other; and lowered attention, which may result in temporary psychic blindness of one or both eyes.

The second classification of weaknesses—that of localizing the object—may be due to poor distance judgment or muscle imbalance, causing diplopia or double images. Cases of double images with as slight as 3 degrees of exophoria—eyes tending to turn out—have been noted. The driver would see two pairs of headlights in the distance and think one car was attempting to pass another. In reality there was but one car.

The third classification is that of blinding lights. Persons differ enormously in this respect. Older persons are usually more disturbed and more easily blinded by glaring lights than younger persons. Likewise lowered acuity is associated with inability to tolerate strong lights. Persons least disturbed by glare can stand forty times as much contrast as those most affected. We are hoping that the perfection of polarizing glass may solve the glare problem soon.

Space will not permit the description of other deficiencies drivers have in the way of physical weaknesses. Sluggish action, slow reaction time, inability to evaluate situations quickly, nervousness, poor motor co-ordination, and poor attitudes represent a few of these. The so-called careless or reckless driver does many things which can easily be explained if his behavior is properly analyzed. Our experimental studies have gone a long way, but much more remains to be done. All factors must be studied in relation to each other before a satisfactory final solution can be reached. The quest for new relationships must be continued in order that we may get at the root of the accident problem. The applications of such studies will gradually be used as the results are more firmly established. It is for this reason also that the quest must be continued. States with rather rigid standards like Connecticut have done a great deal to reduce accidents. Recent reports place Connecticut high in the list—first during 1936. Some other states have no

standards at all. Their accident experience is very bad and increases have gradually mounted.

In summary let me merely say that one of the best ways to decrease accidents is to apprise the driver of his actual potentiality as a driver. This has been demonstrated in commercial companies. Most drivers think they are good. Actually some are 15-mile-an-hour drivers. Others are 25-mile-an-hour drivers. Still others may drive safely at 35, 45, or 55 miles an hour, under favorable conditions. A very few might drive safely at 65 miles an hour. Our experience with racing drivers shows that they drive only 45 to 50 miles an hour when on the highway, yet some 25-mile-an-hour drivers have boasted to me that they do 90 miles an hour. One might answer that not every one of the German artillery hits was fatal, yet it was not healthy or conducive to good health to be caught in a barrage. In closing it may be said that a driver should go no faster than his visibility allows. If his eyes are defective, they should be made as good as possible. There will be plenty of danger from other causes at best.

Suggested Regulations for Lighting Sight-Saving Classrooms*

THIS article was prepared by a committee called by the Ohio State Department of Education to ascertain the quality and quantity of light recommended for comfortable, efficient, and economical classroom use by pupils in sight-saving classes. The committee consisted of sight-saving class supervisors, oculists, lighting experts, and school directors.

Introduction

The sight-saving class presents an appealing opportunity for increasing visual efficiency and ease in seeing through (1) the correction of ocular deficiencies, (2) the regulation of visual tasks in accordance with the visual abilities of the pupils, and (3) the provision of adequate light and proper lighting. These are the controllable factors in seeing, and, in this report, certain specifications for the lighting of sight-saving classrooms are presented.

Modern educational methods impose upon the eyes of school children visual tasks which are not only critical, severe and prolonged, but also unnatural. Such tasks are often detrimental to normal adult eyes and are particularly serious to young eyes in a formative period. Obviously, the seriously defective eyes of children in sight-saving classes need all of the assistance which science is capable of giving. Furthermore, it is important to emphasize the fact that the visual tasks of the schoolroom, for these children, will be severe even though ideal conditions are provided.

Size of Sight-Saving Classroom

Though the number of pupils in a sight-saving classroom is usually lower than in a regular classroom, the room should be as large

* Adopted by the Ohio State Department of Education. This article is reprinted, with permission, from the *Transactions* of the Illuminating Engineering Society, September, 1937.

as an ordinary classroom. This is desirable so that the pupils can move around a great deal in order to be able to see to the best advantage.

Orientation of Building

Because of wide differences in climatic conditions it is impossible to lay down definite rules for the orientation of school buildings that will prove satisfactory in all parts of the state. In addition to those important conditions that are necessary for the greatest ease in seeing, there is need to consider conditions affecting ventilation and the psychological reaction of illumination on the child.

A northern exposure may afford a comfortable, steady light under which to work, but in many places such an orientation of classrooms renders them cheerless in the extreme. In some latitudes southern exposures may be preferred because of the greater amount of sunlight they make possible, yet the natural illumination from a southern exposure may be so difficult to control that the advantages such an orientation offers may be quite overbalanced by the disadvantages. Researches tend to show that east and west exposures are preferable in some areas since they give a maximum of light with a minimum of glare.

Quality of Lighting

The quantity of light is by no means the only factor to be considered. The quality of lighting, whether natural or artificial, is of great importance. Distribution of light, diffusion, direction, glare and color of walls and ceiling, and maintenance all have significant effects on seeing conditions.

Glare

The presence of glare is one of the most common and serious faults of lighting. Glare may be designated as any brightness within the field of vision of such character as to cause discomfort, annoyance, interference with vision, or eye fatigue. There are two common types of glare—direct and reflected. Both should be carefully avoided.

Direct glare is caused by light that reaches the eye directly from the source of light. It may be experienced when looking at a bril-

liant, unshielded, incandescent lamp or a comparatively small, bright lighting fixture, especially when viewed against a dark background. Also direct glare is experienced when looking toward windows through which the sun or bright sky is visible or where brilliant sunlight may be seen reflected from buildings or other outside surfaces. Children should not be required to face the windows when they are working or receiving instruction.

Reflected glare occurs when bright images of windows or artificial light sources are reflected into the eyes from walls, ceilings, etc. It often occurs when light is reflected from the surface of glazed paper, glossy desk tops, or shiny blackboards and results in the concealment of the object viewed.

Diffusion

Diffusion is important in order to avoid sharp shadows on the work and sharp contrasts of light and shade in the room. The larger the light source area, the softer and less pronounced will be the shadows. Light should be well distributed over the entire room so as to produce reasonable uniformity of illumination at the work places of all pupils.

Ceiling and Wall Colors and Finish

Marked consideration should be given to the colors of the ceiling and side walls in the classroom. On the large wall areas, buffs with a very little yellow are often used, particularly where the idea of warmth and cheer is to be accentuated. There is some tendency to use the "cool" colors in tints and combinations, predominantly blue or green, since these appear to have a quieting effect and tend to make a room look larger.

The walls should reflect from 50 to 60 per cent of the light falling upon them. The wall area below the window sills should be of a moderately dark color.

The ceiling color should be very light with a reflection factor of 80 per cent. White or bluish white, very light ivory or cream are suitable colors.

The use of moderately light colors is suggested for all woodwork. Fairly light-colored, dull-finished working surfaces on desks and tables are recommended.

Avoidance of Shiny or Glossy Finishes

Flat or matte finish paints and dull surfaced materials should be used on all wall and ceiling areas, including the window and door frames and trim. Shiny or glossy surfaces reflect bright glaring spots of light from the windows or lighting fixtures. Matte finishes diffuse these spots of light and reduce brightness contrasts.

This precaution is important in all schoolrooms because young eyes are particularly sensitive to reflected glare.

There seems to be a mistaken idea that shiny surfaces reflect more light than do dull or matte surfaces. Reflection factor depends primarily on color, also, dark-colored surfaces do not necessarily diminish reflected glare. A dark, shiny surface is often more annoying than is a light colored one from this standpoint.

Control of Natural Illumination

The most satisfactory control of natural lighting, at the present time, appears to be obtained by having at each window two translucent, buff-colored shades in soft finish. It has been found that these are effective in diffusing direct sunlight and in preventing glare. Shades in soft finish will not crack and are easily cleaned. The rollers of these shades are placed at or near the center of the window, one directly below the other, the space between them covered by a V-shaped metal bar. Such shades should be wide enough to prevent streaks of light from entering at the sides. To accomplish this it is usually necessary, unless the windows are deeply recessed, to fasten the rollers on the bastions.

As specified in the Ohio State Building Code, the glass area of the windows should be not less than 20 per cent of the floor area. Since the best light comes from the top of the windows, in order to insure as much natural light as possible on the far side of the room, no sight-saving classroom should be wider than twice the distance from the floor to a point 6 inches above the top of the glass in the window.

Unilateral lighting is desirable as this reduces cross lights and shadows to a minimum.

Minimum Level of Illumination

Since the eyes of pupils in sight-saving classrooms are unable to carry their full share of the load of seeing, compensation should be

provided in the form of extra illumination. The results of carefully conducted studies and of the best current practice based thereon indicate that the minimum, sustained, operating level of illumination should not be less than 30 foot-candles, with higher values often desirable.

Artificial Lighting

To maintain good seeing conditions, artificial lighting must be supplied when daylight fails, as on dark and cloudy days. In some localities such deficient daylight conditions prevail for more than half of the school hours during the year. Further, it is not always realized that even on bright days, except for desks very near the windows, levels of illumination from natural lighting of the order of 30 foot-candles, are seldom found in the average classroom; hence natural lighting must be supplemented by artificial lighting. On dark and cloudy days dependence must be chiefly on artificial lighting.

Type of Lighting

To secure the indicated level of illumination with a minimum of direct and reflected glare, with the light well distributed and diffused and with harsh shadows eliminated, totally indirect lighting should be used. If a slightly luminous bowl effect is desired for psychological reasons, at least 95 per cent of the light should be directed to the ceiling.

Control

Wiring and switches should be so arranged that the row of lighting fixtures on the window side and the row on the inner side of the room can be controlled independently.

It is well known that the human eye is not able to judge accurately varying levels of illumination; hence lamps are often not turned on when really needed. The photocell control is being used to turn on or off automatically one or both rows of lighting units when daylight goes below or above the required levels of illumination, thus assuring good light for all students at all times and relieving the teacher of the responsibility.

Blackboards

1. The large wall area occupied by blackboards is somewhat of a handicap to good lighting and seeing conditions. The black areas absorb some of the light which would otherwise be reflected to the desks. Shades the color of the window shades are sometimes drawn to cover the blackboards when not in use.

2. For most sight-saving classes blackboards on one side and at the front of the room would provide ample accommodations for the pupils.

3. Special blackboard lighting units are desirable to provide adequate illumination on the blackboards.

Suggested Regulations and Recommendations

Rule 1. Minimum Illumination Values.—Illumination over the work area shall be maintained during all periods of use at a minimum, sustained, operating level of not less than 30 foot-candles. The illumination shall be measured on the working plane, such as the desk or table tops.

Rule 2. Natural Lighting.—Unilateral lighting is recommended. The minimum glass area should not be less than 20 per cent of the floor area. The bottom of the glass shall be at least 3 feet above the floor and the height from the floor to top of glass, plus 6 inches, shall be not less than one-half of the width of the room.

Windows shall extend toward the rear of the room at least as far as the front of the last row of desks and well toward the front of the room. No window should be nearer than seven feet to the front blackboard.

Rule 3. Artificial Lighting.—Except for desks very near the windows, levels of illumination of the order of 30 foot-candles are seldom found in the average classrooms, hence natural lighting must be supplemented by artificial lighting. On dark and cloudy days dependence must be chiefly on artificial lighting.

Totally indirect lighting, with or without a slightly luminous bowl effect, is required. If luminous bowl indirect lighting units are used, not less than 95 per cent of the light output shall be directed to the ceiling.

Ceilings shall be painted a very light color with a flat or matte finish and have a reflection factor of 80 per cent.

Side walls shall have a flat or matte finish with a reflection factor of 50 to 60 per cent.

Rule 4. Diffusion and Distribution of Light: Avoidance of Glare.—Lighting, whether natural or artificial, shall be such as to avoid glare, objectionable shadows, and extreme contrasts, and to provide a good distribution of light. In artificial lighting systems, lamps shall be so installed in regard to height, location, spacing, and glassware, reflectors, or other suitable accessories, as to accomplish these objects.

Recommendations.—The following recommendations are presented:

1. It is recommended that special blackboard lighting units be installed over all blackboards.
2. Since the eye is a very poor measuring instrument and since it is essential to be sure that pupils always have adequate illumination and to provide for the most effective control of a lighting system, it is recommended that photocell control be used to turn lamps on and off automatically when daylight goes below or above predetermined levels of illumination.

The Social Service Aspects of Refraction*

Jeanne Wertheimer

THE method of procedure in getting glasses for patients who need them, and for getting patients who need glasses to wear them, is essentially the same as in other medical social services.

IN these latter years, with more unemployment and more families on relief of various kinds, the problem of procuring glasses, because of the cost of medical care, has grown greater. There is the expense connected with the refraction itself and afterward the cost of the glasses, which may be more necessary for play than for work. Then with fewer private clinics accepting relief clients, patients have to wait for months before they are able to obtain an appointment. This combination of personal and community incapacity causes great difficulties. And these difficulties interpenetrate further than merely poor eyesight or conservation of vision, in any of its forms. The emotional strain which may be a result of poor vision or headaches, and the hours of the day when one can do nothing if one is presbyopic and without glasses, must surely have a damaging effect on the tempers of a family.

There are many clinics, of course, where the optician or a registrar attends to the glasses. Since the subject of this paper is the social service aspect of refraction, it necessarily implies that there is a social technique here. If it is the function of a social worker, it is a case-work process, which means that each case is seen as an individual. This is the first step in any treatment—and glasses are a treatment.

The majority of patients will present defects of vision which are not a serious handicap. These patients need glasses only to continue their usual way of life. But even with these patients it is

* Presented at the Institute on Eye Hygiene of the National Society for the Prevention of Blindness, May 17, 1937.

necessary to learn the art of "selling" the glasses. This is particularly true, for example, of the adolescent girl who is more interested in her looks than in her comfort or in medical recommendations. It may be necessary to "sell" these glasses to her in some piecemeal fashion or to do some special thing about frames. The main object is to get her to wear them when she needs them.

The Medical Social Worker's Objective

I believe the objective of the medical social worker should be prevention of blindness and the prevention of an individual's distress. For, after all, one can do as much for alleviating his distress as for his blindness. Glasses may correct the refractive error, but it is questionable in certain types of cases whether they lessen the progress of the disease, as, for example, in malignant myopia, or in amblyopia ex anopsia. Therefore, both objectives must be kept in the foreground. Now in all our organizations we have varied rules: we may use only a certain type of frame; we may give only certain kinds of lenses; or we may give a certain number of glasses per month, etc. If we are case workers in any sense of the term we will find the way of getting proper glasses which the patient will wear, and getting them for him as soon as he should have them. If a child will not wear the regular frames, there is no sense in spending the money for them. No glasses should be ordered without the patient's knowing exactly what is being ordered. Distress can be obviated at times by providing frames that the patient would like to wear, even if they are second-hand from the doctors, boards, or friends. And this can save the social service department a little money, in addition to pleasing the patient.

In New York City all opticians give schools a flat rate on lenses and frames. When we give a school child second-hand frames, of course we explain to the school the difference in the frames. Our explanatory letters to the schools include the corrected vision and any recommendations. In turn, we have had some interesting answers which show that children are really wearing the glasses and sometimes are actually proud of them. One boy who had never shown any interest in his Latin took a great interest in it after putting on his glasses, even to the extent of being in the honorary Latin play.

The Economic Responsibilities of Each Case

One important thing to remember about glasses is that when one accepts the responsibility of giving or arranging for the obtaining of a pair, this is only the beginning, economically and socially, of the problem—economically, because there may be breakage in a week, or the need of a change of lens in 6 months or a year. If perhaps the patient has been in a position to pay for his first glasses and later is out of work and needs them, it is essential to help him, either through the social service organization, if its rules will allow, or in some other way. Since, as the clinic grows, the need for providing glasses steadily increases, the annual count must be taken into consideration as new patients are registered. The keeping of statistics will help in planning the worker's time and money allotted for the coming year. For instance, in 1929 a certain social service agency was arranging for 20 glasses per month; in 1933, 50 per month; and in 1936, 95 per month. The amounts in loans and gifts had rearranged themselves over these years from twice as many loans previously, to merely half as many, later. Therefore it is necessary that these records be watched in order to continue the pace originally set. If, for some reason, this cannot be continued, the statistics will supply a gauge and show the necessity for cutting down the number of new cases, to allow means of caring for persons already on the books and for limiting the intake of new glasses.

There is one other economic responsibility and that is to arrange to have some funds available for the procuring of glasses. Providing a patient with an excellent refraction and then giving him the prescription, when he has no means of having it filled, are of little help either in preventing distress or preventing blindness—temporary or otherwise.

The Social Responsibilities of Each Case

The social responsibility has perhaps four divisions. The first is the referring of patients to the sight conservation classes. Occasionally the need arises of informing the sight-saving class of improved vision, which would permit the child to attend regular classes. In that case it is advisable to write graphic interpretative letters to the regular school and perhaps check up for a while,

either through the family or by visiting the school directly, to ascertain whether any help should be given or suggested. This procedure is necessary for the highly myopic child. If the school realizes the medical situation sufficiently and understands why the child was perhaps not making the proper grades, it could arrange for a reader, or the case-worker could do so. Until the establishment of a sight-saving class in the district has been arranged, ingenuity and medical knowledge will have to be applied in each individual case. I believe this last holds true even when these classes are available. There may be extenuating circumstances, at least temporarily, which may make it necessary to adjust a patient in a regular class.

Another social responsibility in procuring glasses is not to lose sight of the whole patient. This entails, first, the carrying out of the medical recommendations—hygiene, lighting, etc.—depending on the medical diagnosis; secondly, the understanding of the social diagnosis and treatment and where the social impinges on the medical diagnosis and, in some instances, such as in primary glaucoma, where the social aspects may be part of the etiology of the disease. In a case of progressive myopia, for instance, in a twelve-year-old boy with an inadequate income, who lives in a crowded home, and who helps by selling papers in the subways at night, one naturally does the expedient thing first, which is correcting the vision with glasses. Then there is the problem of increasing the income while at the same time stopping the child from selling papers. The family must be educated regarding the patient's needs. They must be made to understand the importance of getting this boy away for two summer months where he will have good hygiene and can enjoy group work, during which time the economic situation in the home is being improved. When this is made clear to the patient, or patient group, the preventive aspects of the trouble, such as the hygiene and check-up of refraction, as a follow-up, is just a routine. Since myopia tends to run in families, it is well to inquire regarding other children.

A second example in seeing the patient as a whole is that of primary glaucoma. Perhaps he needs reading glasses, and for that reason has been referred to the social worker; but perhaps even when he has his eyes directed toward his newspaper his mind is

not directed there, for he is bothered by a sick and nagging wife who will not go to the doctor herself. Let us say that this man of 50 has 20/20 vision, practically perfect fields, and tension that remains under control. The two objectives of preventing blindness and alleviating his distress would be achieved if the emotional factors in the case were analyzed—in this instance, the wife and the patient's attitude toward her.

The next responsibility probably cannot be placed upon the case-worker alone. Whose responsibility is it to help direct a child who finishes a sight-saving class in elementary school to a proper high school? or from a high school into a vocation or further training? This is an essential step he is making. If he has been in a sight-saving class he has been pretty much the white-headed boy. And these very children who are the most handicapped need most to be taught independence and to increase other abilities to compensate for their handicap. In place of this, frequently, such a child is spoiled more than the other children, at home as well as at school. The teacher, often, in her anxiety to see him pass, practically does the work for him. Then when he graduates from elementary school the chances are that he will be allowed to drift into the school he chooses. The parents, in their eagerness to see him "normal," allow it. A similar situation obtains for this child when he is 16 and can go to work; or for a child who has been able to graduate from high school but, because of his high myopia, should have some vocational advice before plunging into the industrial world. Each child's future must be worked out on an individual basis. The schools do not always understand about the visual handicap nor the vocational adjustment. The child changes schools just as he may also change clinics. Moreover, the medical social worker must not be depended upon forever. Therefore, as I see it, we must instill in the patient and the parents what we believe they should realize concerning the child's best future interests. In the cases of progressive myopia, for example, if the doctor advises it, we must teach them to lead the children away from football to pleasures of the mind. Doctors sometimes disagree in these recommendations. To take away all that a boy enjoys does not seem good prevention. His spirit is to be considered. Besides, if you do this in the case of a very high myope, for

example, and he goes out for the simple pleasure of a walk and either stumbles off the curb or on a banana peel and has a retinal detachment, what good has resulted from making him unhappy during months of deprivation?

And so I say it can be no one person's responsibility to direct the education or vocation of a visually handicapped child. But it is up to the social worker to do what she can in the time allotted. Some parts of this can be accomplished by getting *en rapport* with the child and the parent so that they understand the implications in a sane way and feel that they have someone to consult. The social worker can interpret to the school. She can be certain that the patient's name is in the follow-up file, which will carry his problem along for her or the next worker. In this way, fewer children will get into and continue in regular high school who cannot carry on and hence become frightfully discouraged.

The fourth social responsibility is the follow-up, unless this is accomplished by the clinic management, or other plan in a different type of agency. The follow-up is a routine which can be managed with good results by a well-trained clerk only if the social worker has screened the case and knows what the situation is. A good response from follow-up will never be attained unless there are no obstacles in the way of the patient's understanding and carrying out the treatment. For this follow-up, a card file or some similar system is necessary. The system should be so planned as to give the patient a reminder that time has gone by, and to furnish the data at the end of the year which will show the degree of accomplishment achieved.

The social implications of strabismus are far reaching. Beyond the actual saving of vision before it is lost through amblyopia, there is the saving of personality, in many cases. We still have adults who have continued wearing glasses and, like the ostrich, only fool themselves. If you are astute, you will be able to find out how unhappy they have been about it all and perhaps that they use this defect as a reason for not keeping or getting a job. With the young child whose mother usually prefers trying glasses first before operation for correction, it is, of course, necessary to arrange for these glasses. If the child is brought in early enough, it is important, for the preservation of vision, that his name be en-

tered in the follow-up file so that in time he can have the proper operation.

Glasses for Cataract

We have considered the social implications for the correction of astigmatism, hyperopia, myopia, presbyopia, and strabismus. There are also glasses for cataract. My main problem here is to warn patients not to be discouraged about getting used to their distance correction and to be sure to walk with someone in the beginning when they go on the street. Without their normal lens they, of course, have no power of accommodation and they must learn the trick of "seeing" steps or a curb lying ahead of them. In a very short time they adjust themselves and are happy. There is one social difficulty with glasses for cataract and that is the fact that the patient's eyes appear so large. Despite perhaps having perfect vision, they sometimes have difficulty in certain types of work where they must appear presentable, such as the work of a waiter.

A type of glasses much mentioned these days are telescopic glasses. They are not always satisfactory, even when the vision can be well corrected. This is because of two factors: one is the weight and appearance of these glasses and the other is the extremely contracted field for reading. We have given two pairs to children who had been through sight-saving classes. These glasses have helped them go through regular high school with normal, though slow, reading ability. Another pair is used by a man, a cleaner in an institution. He also belongs to an orchestra. Though the glasses do not help him in his work, they do give him pleasure in reading the musical score and in other reading.

Contact Glasses

Contact glasses have their social uses. A girl of 20, a dancer, thought that she was having difficulty holding a job because her vision was so poor without glasses that she could not recognize her own boss if she met him on the street, and, of course, she could not wear glasses on the job. Uncorrected, her vision was 5/200 and with a minus 5 lens it was corrected to 20/15. The interior of the eyes was negative. The question comes up, what should be one's attitude in helping this myopic woman to be a dancer? It does

not seem to be a progressive condition. She is full grown. She is not a high myope. Her life, as her mother's before her, centers around the stage. Should her work be changed? With all her present economic and other insecurities should one even mention the fact that dancing may not be good for her eyes, when at the same time there is only a long chance that she would be in for trouble, and her vocation is a fixed thing? I bring up this social aspect because it would show again the necessity of individualizing in each case and not going by rote. At any rate, the girl in question was fitted with contact glasses and she is riding on the crest of the wave.

Summary

Thus we have suggested the community aspect of the problem; the fact that to do the job satisfactorily for the patient as well as for herself, the social worker must individualize; and, thirdly, we have considered the social worker's responsibility, economic and social. One must know primarily how to deal with people and to interpret the medical diagnoses, with their social implications. The rest of what is done depends on the group handled by the particular institution and that institution's limitations. The method of procedure is the same in every medical social service.

The Ear, Nose, and Throat in Relation to Blindness

J. H. Sulzman, M.D.

IN this article Dr. Sulzman points out how ear, nose, and throat specialists do their part in preventing blindness by treating the various focal infections which can, if allowed to progress, affect the health of the eye

IN a consideration of focal infection as related to blindness, it is necessary to recall that vision is a function performed by a complicated pathway, composed of the eyeball, optic nerve, optic chiasm, optic tracts and radiations, and mid-brain and occipital lobe centers. Also, that blindness may be complete or partial, and that the extensive pathway of visual impressions traverses the anterior portion of the skull and the posterior two-thirds of the major portion of the brain substance.

For purposes of convenience, the subject matter will be treated in the following order: (1) throat, (2) ear, (3) nose and nasal sinuses, and (4) miscellaneous considerations.

The Throat in Relation to the Eye

The throat or pharynx is a junction of the air and food passages, beginning at the posterior part of the oral cavity, and extending to the level of the larynx and upper end of the esophagus. It is of importance in a consideration of blindness in that it includes structures of considerable importance as possible foci of infection, which may be the lodging place and portal of entry of a variety of pathogenic organisms. These foci are the lymphoid structures of the palatine and lingual tonsils, the adenoids, and less condensed nodules of the same type of tissue. Micro-organisms may gain entry to the bloodstream by being filtered through these struc-

tures, and the actual organisms or their toxins may cause ocular conditions, some of which result in partial or complete blindness.

The throat may also be the site of tumor formation, which may similarly be a possible cause of blindness through so-called metastases, or spread, through the vascular routes to invade the visual pathway and endanger vision, or even life.

The Ear in Relation to the Eye

The ear is the organ of hearing and equilibration. It is embedded in the substance of the temporal bone, which also conveys the motor nerve to the muscles of facial expression, including the eyelids. The temporal bone gives its name to the temporal lobe of the brain, directly above it, through which passes the optic radiation, a part of the visual pathway. An important part of the temporal bone is the mastoid process, immediately behind the external ear and communicating with the middle ear. Inflammation of the middle ear frequently extends backward to involve the mastoid, and, occasionally, to include the lateral sinus, which is a very large blood channel encroaching on the mastoid area. Through the lateral sinus, organisms may enter the bloodstream to carry infection to various parts of the body, including the eye, with serious results.

Inflammation of the mastoid may spread upward to cause meningitis, and this may occasionally extend and become a localized process in the temporal lobe, constituting a brain abscess in the area of the optic radiation, with loss of function of the optic radiation fibers involved. Finally, the facial nerve, which carries motor function to the muscles of the face and which runs through the substance of the mastoid bone, may be involved in mastoiditis, either as a result of destruction by an extensive inflammation, or by injury during surgery for removing the diseased portion of the mastoid process. Whatever the cause, destruction of the function of the facial nerve results in a paralysis of one side of the face. This is turn leads to inability to close the eyelids completely, which exposes the cornea to infection and ulceration. Cases are not infrequent in which ulcers from this combination of circumstances have resulted in corneal opacities, even perforation of the cornea, and loss of vision by intra-ocular infection.

Not only a brain abscess but an intracranial tumor may cause blindness, in the form of a new growth arising from the nerve of hearing—the "acoustic neuroma" of the auditory nerve. This may cause blindness as a result of pressure on the optic pathway fibers or on the center of vision in the occipital lobe of the brain in the back of the head. Also, by increasing intracranial pressure during its growth, it may cause edema of the optic nerve, with later atrophy of this nerve and blindness of the eye on the same side as the tumor, or of both eyes. In any event, an acoustic neuroma is extremely serious, and frequently exceedingly difficult to diagnose.

The Nose and Nasal Sinuses in Relation to the Eye

The nose and accessory nasal sinuses act as air passages, as the site of the sense of smell, and as chambers where air breathed in is warmed and moistened on the way to the lungs. This is possible because the membrane lining them is extremely well supplied with blood vessels, some of which traverse the orbit. These latter may act as pathways of infection from the nose and sinuses to the orbit and eye.

The passage for drainage of the tears—the lacrimal duct—is a direct connection between the nose and the outside of the eye. The importance of the lacrimal duct may be realized when it is stated that nasal infections can ascend the duct and bathe the outside of the eye with infectious material. This hazard is especially likely when the eyeball has been opened surgically. In other words, an operation on the eye can result in loss of vision if organisms from the nose reach the operative site by way of the lacrimal duct.

Besides the blood vessels and the lacrimal duct, another possible pathway between the nose and the eye is through the lymphatics, which drain the tissues in this region, as they do in every other part of the body. And, finally, the eye is closely connected with the sinuses by its anatomical position, being in relation superiorly with the frontal sinuses, medially with the ethmoid sinuses, inferiorly with the maxillary sinuses, and posteriorly with the sphenoid sinuses. These sinuses, especially the ethmoid sinuses, are separated from the orbit by relatively thin walls of bone, so that sinus infec-

tions often break through to invade the orbit, its lining membrane, and delicate contents. This is occasionally rendered even easier when small perforations occur in the bony walls, offering direct access to the orbit in the presence of nasal and sinus infections, or during surgery in the interior of the nose.

Such thin walls of bone may be readily destroyed by the pressure of tumors arising in the sinuses, or by disease of these bony walls themselves. Also, they may be accidentally perforated by routine intranasal treatments, as in irrigations of sinuses. Fortunately, the latter occurrences are rare, and have practically no sequelae. Orbital infections do not always result in damage to the eye, and even if not drained by operation, have been known to clear up by being absorbed gradually.

Tumors in the nose and sinuses may cause blindness, whether they appear in the form of benign swellings or in the form of malignant tumors arising from the mucous membrane lining the sinuses, the so-called carcinomata, and those arising from connective tissue, or sarcomata. These are especially vigorous in growth and are always dangerous to vision and life.

The optic nerve is vulnerable to extension of inflammations in the sphenoid and posterior ethmoid sinuses, and frequently these sinuses may be so arranged anatomically as to surround the optic nerve partially or completely, and are separated from it by thin walls of bone subject to all the variations described above. This constitutes retrobulbar neuritis when the nerve is inflamed behind the eyeball, and the exact importance to be ascribed to the nasal sinuses is not a matter of agreement among ophthalmologists or otolaryngologists.

Lastly, the problem of focal infection from such sites as the tonsils and nasal sinuses, and the result of such infection upon the eye and optic nerve, are subjects of dispute among physicians. There is evidence both for and against the theory that infection in distant foci may cause eye diseases under certain circumstances. Among the conditions ascribed to focal infection are: inflammations of the coats of the eyeball—scleritis, choroiditis, retinitis and macular degeneration—also iritis and optic neuritis; and disseminated ocular infections—endophthalmitis and panophthalmitis. It is certain that improvement in eye diseases which can

produce blindness has followed the removal or drainage of such infected foci in many cases, though not in all cases.

In conclusion we can understand the complexity of the problem of blindness in its relation to the ear, nose, and throat when we understand in how many ways they can be involved in a variety of disease processes, and how the ear, nose and throat specialists can aid in the prevention of blindness.

Research and Prophylaxis in Sight Saving

A Tribute to Winifred Hathaway*

Park Lewis, M.D.

DR. LEWIS, in presenting the Leslie Dana Gold Medal to Mrs. Hathaway, discussed the partnership between the layman and the medical man in saving sight. Mrs. Hathaway in her response enumerated the distinguished recipients of the Dana Medal who preceded her and sketched their respective contributions to sight conservation.

THE future development of ophthalmology must follow along two parallel lines of direction. The first of these will take its origin in research.

We must know more of the causes of obscure ophthalmic disturbances. We must discover more exactly the cellular interchange that takes place in the deeper eye tissues. We must investigate more intimately the chemical processes that are active in the ultramicroscopic structures in the living cell, and the conditions that modify them, conditions that unbalance the intra-ocular tension, that affect the nutrition of the lens, that destroy the intima of the arterioles, replacing the elastic fibers with mineral deposits. These, and a multitude of equally important problems, are now awaiting solution.

To get an answer to any of these puzzling questions is to take a long step toward preventing them.

So the second activity in the ophthalmology of the future will follow the line of preventive measures.

Research and prophylaxis will be our watchword during the coming year. Both have been carried on independently almost

* Remarks by Dr. Lewis in presenting the Leslie Dana Gold Medal to Mrs. Winifred Hathaway, at a meeting of the Association for Research in Ophthalmology during the convention of the American Medical Association in Atlantic City, June 8, 1937.

since the beginnings of medicine. We have always sought to know how disease was caused and how it might be avoided. As organized movements, both are relatively new, but their purposes are so closely allied that it seems eminently fitting that a meeting of the Research Society should be the occasion and the place chosen to do honor to one who for two decades has been an active leader in the movement for the protection of human sight.

When Mr. Leslie Dana established a fund which would provide a gold medal to be presented annually to one chosen for distinctive service in the prevention of blindness, he perhaps acted more wisely than he knew. He realized, beyond doubt, that vast numbers of eyes go to destruction before they reach the ophthalmologist's control, that multitudes of people, through indifference or ignorance, neglect menacing symptoms even after they have been warned of their danger, and he hoped by bringing more closely together the skilled specialist and the public, that this gulf might be bridged and the unnecessary losses of eyes diminished. But he did not know, and he could not have realized, the ethical barriers that had to be bridged to make preventive measures reasonably effective. The physician, although he may daily have pathetic instances of people seeking help after irreparable damage has been done to their eyes, may not personally go into the highways and byways to warn them lest his motives should be misinterpreted.

When the National Society for the Prevention of Blindness was organized, more than a quarter of a century ago, the medium through which this could be done was established. The founder, Louisa Lee Schuyler, was socially minded. She anticipated the Red Cross in the personal service which she rendered during the Civil War. Through her efforts the Children's Aid Society was organized.

Her shrewd intelligence and her wide experience made it at once apparent that expert medical knowledge was of first importance in any preventive movements undertaken, but that, this having been secured, it would be ineffective unless, and until, socialized. So in the formation of the Society the directorate included in its membership some of the most eminent ophthalmologists in the country. Their advice and their co-operation were continually sought and freely given. Among those whose labors have been fin-

ished were such men as Hiram Woods of Baltimore, Posey of Philadelphia, Cutler of New York, Wilder of Chicago and Wilmer of Washington.

We bow in reverent memory as we speak these names.

The first to receive the distinguished service medal was the Dean of American Ophthalmology whom we all delight to honor, Edward Jackson. The second, indicating the liaison between social service and medical practice was the founder of the movement, Louisa Lee Schuyler. Then followed such eminent leaders in ophthalmology as de Schweinitz, Wilder, Luedde, Wheeler, de Lapersonne, to whom it was presented in Paris, and Fuchs, who was its recipient in Amsterdam at the Thirteenth International Ophthalmological Congress in 1929.

Then again the social relationship was emphasized when the medal was presented to our lamented Dr. Edward M. Van Cleve, who for eight years was a director and manager of the National Society for the Prevention of Blindness, and whose wisdom and judgment led it around many pitfalls.

There was, however, quite another phase of preventive work which was actually a part of the responsibility of the ophthalmologist, but which he had been wholly unable to control. It had long been realized that the rigid curricula of the schools were not suited to eyes that were unable to tolerate continuous and exacting work. But what could the physician do where school arrangements were unalterable? The child could indeed be ordered to discontinue his studies for one or two years, but the hardship of interfering with his education and halting his progress might be equivalent to changing the entire future possibilities of his career.

In 1908 Mr. Bishop Harman endeavored to solve the problem by causing myope schools to be established in London. In America this matter was of equal importance; that it concerned the child, the parents, the physician, and the school authorities was self-evident.

A complete understanding and the fullest co-operation among all four were needed to meet the situation. Ophthalmologists had shown that as the school age progressed the numbers of myopes increased and the degree of myopia with each school year grew higher.

But they had no control over the school curricula. This rested with the educators. The parents, anxious as they were for the preservation of their children's eyes, could not exact special privileges for individual children. Then there came an impasse. Those who knew what should be done could not control conditions, while those in authority in the schools had not yet been sufficiently impressed with the necessity to make radical changes in the routine methods.

In April, 1913, chiefly through the efforts of Dr. Edward E. Allen, superintendent of Perkins Institution and Massachusetts School for the Blind, the first sight-saving class was established in Roxbury. Cleveland followed suit: in September of the same year a class was established through the efforts of Robert Irwin. These classes made a firm foundation on which to build, but a national interest was necessary for further development.

In 1916 the National Society for the Prevention of Blindness had the rare good fortune to add to its staff Winifred Hathaway, a woman of exceptional gifts and of unusual training. A graduate of Radcliffe, she had taken her Master's degree from the University of New York. She had had teaching experience in the Department of English and as Director in the Department of History at Hunter College, New York. She had organized classes and clubs for working girls, and had done research work for the State of Massachusetts. As a teacher and principal and a former social worker, she immediately recognized the importance of bringing to the educators the urgency, in the care of partially seeing children, of intelligent medical control of the situation. An educational campaign was instituted. During the past two decades she has addressed hundreds of audiences of parents, teachers, social workers and children on this subject. She has given courses for the training of teachers and supervisors of sight-saving classes at Columbia University, New York University, the University of Cincinnati, the University of Southern California, Peabody College and numerous normal schools. She has been for years the guiding spirit in the sight conservation movement among American educators.

Largely through her personal inspiration and encouragement sight-saving classes for the education of school children with defective vision have been established in many communities. There are

now 525 of these classes in 169 communities throughout the United States, and their numbers are increasing.

In order to foster the idea of making education possible for partially sighted, this messenger of light has visited practically every section of the United States, travelling thousands of miles, speeding the message that children with visual handicaps need special classroom facilities and special teaching methods. After she spent some months in Hawaii, a native pupil nurse was sent to New York so that she might learn and carry back to those distant Islanders the principles of the prevention of blindness and of the formation of sight-saving classes. A cultured and educated Egyptian woman came over here for instruction, and a serious-minded Japanese student is planning to come in the near future. Could any measures be more likely to develop international friendships and to promote amity between the nations than these?

Mrs. Hathaway's influence in modern education has extended beyond the borders of the United States. In 1926 and 1932 she visited Europe to confer with educators and ophthalmologists concerning the work of sight-saving classes. On the latter visit she represented the United States at the Conference in Paris of the International Association for Prevention of Blindness. While the sight-saving classes originated in England, the greater development of the idea in America has given an impetus to the establishment of additional classes in many countries.

This is but a partial list of the great services to humanity that have been so quietly and modestly rendered by this distinguished woman. The tale is but half told when we say that she has doubtless brought the story of the need and the methods of safeguarding sight to a larger number of persons than any man or woman in the United States.

Because of the things that she has done, because of her selflessness, of her thoughtfulness, her self-abnegation, the altruism that has characterized her every daily act, we have summoned this woman, Winifred Hathaway, that we may do her honor in the presence of her collaborators, the ophthalmologists of America.

And now by virtue of the authority vested in me by the vast multitude of those to whom she has brought light, I hereby proclaim that Winifred Hathaway shall no longer be designated as

ordinary women are, but that she shall be known as Lady Winifred, the Beneficent, the Light-Bearer, and in token thereof we have caused to be graven on a disc of minted gold her new name: "The Lady with the Lamp."

Response to a Tribute

Winifred Hathaway

In undergraduate days there was, at commencement, a supreme moment when the candidates for the Ph.D. degree, having gone to the platform to receive their honors, the President held out his hand to them and said, "I welcome you into the goodly company of scholars." It always seemed as though a door suddenly opened admitting them to that goodly company that had already passed through. This medal indicates the opening of just such a door of opportunity and it is indeed a goodly company on the other side.

Edward Jackson, the first recipient of this medal, is dean of ophthalmologists. Perhaps he can best be characterized by an incident that occurred at a conference at which a teacher was giving a demonstration lesson to a group of children on choral speaking. She was very anxious to have the members of the audience enter into the spirit of what she was about to present, but did not know how to include them. She need not, however, have been anxious, for there in the front seat was Dr. Jackson, eager to participate. In a moment he was swaying rhythmically with the children to the cadence of the verse and rocking an imaginary baby in his arms as he crooned, with them, the lullaby. One by one the people in the audience joined; all self-consciousness had disappeared. The demonstration was a success because everyone there subconsciously recognized that where Edward Jackson leads, it is not only advantageous, but interesting, to follow.

Louisa Lee Schuyler was one of the founders of the lay movement for the prevention of blindness which later grew into the present national organization. At her mother's knee she learned service to humanity and devoted herself to this during her long, useful life.

Lucien Howe, father of ophthalmia neonatorum legislation, interested in heredity and in euthenics as factors in preventing blindness and saving sight, was founder of the Howe Laboratory of Research, in which others are carrying on the work for which he laid the foundation.

Ernst Fuchs, international dean of ophthalmologists, when a young professor of ophthalmology at the University of Liége, awakened the world by his essay on the causes and prevention of blindness, a work as virile and far-visioned today as it was when he wrote it, over fifty years ago.

Park Lewis, beloved physician, with Miss Schuyler one of the founders of prevention of blindness work in America, is a connoisseur of literature, of music, and of the other arts. Where preventing blindness and conserving sight are concerned, he recognizes no boundary of nation, race, or creed.

George E. de Schweinitz is a name to conjure with in ophthalmology. He is a prolific writer who early realized that to be a great teacher one must always be a great learner.

Edward M. Van Cleve, preceptor, guide, friend! Out of his daily contact with the tragedy of blindness grew his greater work of preventing like tragedies. In a world grown skeptical because of war and disillusionment, he kept his faith in the things of the spirit and on this he built a living monument.

William H. Luedde—how better can he be characterized than as the Spirit of St. Louis!

Professor de Lapersonne, a gentleman of the old school, was French by birth, tradition, and education, but international in mind and in spirit.

William H. Wilder's broad social viewpoint led him to believe that the more people knew and understood, the more they would co-operate in working to bring about desirable results, and hence he taught them.

John M. Wheeler—how often have his skilled fingers held back the threatening curtain of darkness and let in the light? Skilled fingers that have carved for him a niche in the highest place of eye and plastic surgery.

A goodly company! Indeed, so goodly a company that each would ever have in remembrance the fact that his achievement was

made possible by the work of others; research workers, who are striving throughout the world to find the causes of difficulties and methods of eliminating them; the gallant company of men and women who made human test-tubes of themselves so that the knowledge resulting from their suffering and even from their death might assuage and if possible prevent the pain of others; the general practitioner and the obstetrician who, stressing prenatal care and prophylaxis at birth, have done so much to reduce the incidence of blindness and impairment of vision; the pediatrician, who recognized the necessity for the early treatment of strabismus; the neurologists, who have searched out the relation between eye difficulties and nerve centers, and have made possible the early diagnosis of brain tumors; the army of nurses and medical social service workers—Aarons to the Moses of the medical profession, holding up their hands that their strength might be multiplied; the educator; the illuminating engineer; the printer; and the host of others who have directly or indirectly helped to keep eyes capable of seeing.

Many years ago a little girl was given a small silver medal bearing a long name, "scholarship." She probably understood little of its meaning, yet she wore it proudly and perhaps she strutted a bit before the other children. But the wisdom of accumulated years has taught her that then, as now, the medal was given for motive rather than for achievement, and so to Mr. Dana, who has made this exquisite symbol possible, to the St. Louis Society, that has so graciously awarded it, and to all those who have a share in this honor, in the words of the whimsical Barrie, "The old lady shows her medals."

Editorial

Comments of Newspaper Editors

THE work of the National Society for the Prevention of Blindness is a subject of frequent editorial comment in newspapers throughout the country. We are reprinting below a few recent ones which are typical:

Conserving Sight

With the opening of schools in Las Vegas and San Miguel county, it is opportune to call to the attention of parents the necessity of conserving the sight of their children. It is to be remembered that approximately three million school children, or one-eighth of the entire school population of the nation, are handicapped in their education by defective sight, and a proportion of those youngsters are right here.

The National Society for the Prevention of Blindness has made much progress in the gigantic task of conservation of sight, but the co-operation of schools and parents is needed. The schools are doing excellent work in determining sight defects and endeavoring to obtain adjustments, but the real task is up to the parents.

The importance of good eyesight among school children cannot be overestimated. We have come to recognize that defective vision or disease in the eyes of the child not only may have detrimental influence on his school progress, but may react upon his general health and upon his adjustment to his school, his playmates, and even to his family. This recognition has given new impetus to the work of discovering and correcting visual defects among children, beginning with preschool age.

Farsightedness is the most common visual defect among school children; astigmatism is next in frequency, and nearsightedness is third; other common eye defects are cross-eyes and inflammation of the eyelid lining. Each should be corrected as soon as revealed.

Las Vegas (N. M.) Optic
September 9, 1937

Safe and Sane Fourth

As fireworks accidents are particularly menacing to the eyes, it is fitting that the National Society for the Prevention of Blindness, Inc., is the first national organization to make a forcible appeal for a safe and sane Fourth of July this year. Although that benevolent corporation appreciates the general Independence holiday hazards, it naturally places most emphasis on fireworks. Of all the effects of non-fatal accidents, blindness may be the most deplorable.

The folly of relying only on private initiative for protection against fireworks injuries was demonstrated long ago. Public education has contributed to the tremendous reduction in the number of deaths from fireworks in the last 30 years, but legislation has been the most positive factor. The fact that it is barbaric to celebrate the nation's birthday with excessive noise and injuries, deaths and property loss from fireworks is written into many municipal ordinances and some state laws.

This legal regulation of the fireworks traffic apparently will be extended. Certainly there is no evidence of a return to the old deplorable conditions; and the sustained agitation for more regulation is likely to be fruitful. Unfortunately, enforcement of the existent fireworks control laws is not uniformly good; and too many people seem disposed to permit their children to incur grave risks near and on the Fourth of July. The effects of such carelessness cannot be emphasized too much by such organizations as the National Society for the Prevention of Blindness.

Union City (Ind.) Gazette
July 2, 1937

Problems of the Day

The world has always been as kind as possible to the blind. In modern years organized charity has done wonders to help the sightless. But no period before our own has gone out of its way to help those who might become blind. Neither has organized charity done much to save those who might be saved from sightlessness. It seems to have been the case that the world has been willing to give pity but not relief. However, in recent years the National Society for the Prevention of Blindness has come into existence, a most hopeful event. Through efforts to require treatment of newborn babies' eyes, to demand that industry give protection to employees and through other means, blindness is far less prevalent than heretofore. The Society faces a big task, for those who must co-operate have not yet done so sufficiently. Unfortunately the public, not to mention such smaller groups as legislators, doctors and industrialists, have remained apathetic. Now that the new school year is starting, the society renews its campaign for co-operation. The society maintains that eye defects which are not corrected, as they can be to a large extent, may result in loss of sight and also have other harmful effects, such as lack of interest in study or unsocial development. Teachers throughout the country can do much. They can discover what children have eye defects and persuade them to have treatment. Their co-operation is most important to the cause of prevention of blindness.

Brooklyn (N. Y.) Citizen
September 9, 1937

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request.

Legal Status of the National Society for Prevention of Blindness

NOTE.—The following excerpt from a letter by a member of the board of directors of the National Society for the Prevention of Blindness in answer to an inquiry regarding the legal status of the Society will be of interest to REVIEW readers who are familiar with many aspects of the work of the Society.

I have been a member of the board of directors and of the executive committee of said corporation since March, 1934. I am also a member of its finance committee. The law firm of Gould & Wilkie, of which I am a member, has been legal counsel to the corporation since its organization in 1918, and to the predecessor unincorporated association for a number of years prior thereto.

Prior to 1918 there had existed an unincorporated group of individuals, ophthalmologists, educators and philanthropists, interested in the prevention of blindness and conservation of vision, known as the National Committee for the Prevention of Blindness. It was the function of this committee to assist local agencies throughout the United States in the philanthropic activities mentioned, to promote the organization of such agencies, and to foster programs for the education of the public directed to those ends, and otherwise to promote the prevention of blindness and conservation of vision by such means as could best be employed through a national organization as distinguished from local agencies.

In order to attain stability of organization it was found advantageous to incorporate this central organization. Accordingly, as of January 31, 1918, a corporation was formed under the Membership Corporations Law of the State of New York, with the corporate name National Committee for the Prevention of Blindness, Inc. The ac-

tivities above mentioned have been subsequently carried on by said corporation. On December 30, 1927, the name of the corporation was changed to National Society for the Prevention of Blindness, Inc.

The purposes of the Society and the scope of its activities are, as set forth in its charter and by-laws:

1. To endeavor to ascertain through study and investigation any causes, whether direct or indirect, which may result in blindness or impaired vision;

2. To advocate measures which shall lead to the elimination of such causes;

3. To disseminate knowledge concerning all matters pertaining to the care and use of the eyes.

As the name of the corporation and its expressed purposes imply, it is concerned with the prevention of blindness and conservation of vision, not with the care and betterment of those already blind. In this respect it operates in a field peculiarly its own and performs a much needed service to society. Particular attention is given to:

1. Advocating adequate prenatal care for every expectant mother, including a blood test and treatment when necessary, as the first steps in the program of preventing blindness from prenatal syphilis.
2. Urging the need for the universal use of prophylactic drops at birth to protect babies' eyes from infection.
3. Demonstrating an approved method of testing the vision of preschool children in order to discover those who will benefit from early treatment.
4. Co-operating with educational authorities in:
   a. Conserving the vision of school and college students.
   b. Establishing sight-saving classes for children whose vision is so defective that they cannot profitably use ordinary school equipment.
   c. Providing specialized training for teachers of sight-saving classes.
   d. Helping student-teachers secure better preparation for meeting the eye health problems of school children.
5. Assisting nurses to become increasingly aware of their opportunities for saving sight and aiding in their preparation for this work.
6. Collaborating with those who are striving to reduce eye injuries and eyestrain in industry.
7. Demonstrating the value of specially trained medical social workers in eye hospitals and clinics and helping such workers to secure specialized training.
8. Stimulating and sponsoring research in relation to the causes of blindness and impaired vision.
9. Providing the public with information concerning the care and use of the eyes.
10. Serving as a clearing-house on all matters pertaining to the prevention of blindness and the conservation of vision.

The Society responds to numerous requests for advice from states, municipalities and industries. The

effectiveness of its work is statistically demonstrated by notable reductions in the cases of preventable blindness as a result of its work.

While the Society derives a certain amount of income from invested funds, representing previous legacies and gifts, it annually expends a much larger amount, the balance being obtained chiefly by numerous private subscriptions of relatively small amounts and in part through liquidation of investments. It is not the aim of the Society to accumulate funds for an indefinite future, but rather to take care of current needs from its current resources. The nature of its work is such that its public usefulness can be materially enhanced by any increase in its resources. There are numerous fields in which its work would be of great public benefit, from which the Society is precluded, or in which its activity is limited, for lack of sufficient funds.

The Society is not, and has never been, a stock corporation nor a profit-making enterprise in any sense. It is conducted solely for charitable and educational purposes. No director, officer, member or employee of the corporation receives, directly or indirectly, any profits from the operation of the corporation. Compensation, reasonable in amount, is paid only to the executive and clerical staff and for professional services rendered in capacities other than those of a director or officer.

The board of directors of the Society consists of thirty prominent individuals in various walks of life throughout the nation, including a number of leading ophthalmologists. The Board meets usually twice a year, at which times it formulates the general policies to be pursued by the corporation. Between meetings of the Board, responsibility for the conduct of the corporation's affairs rests with the Executive Committee, which meets about six times a year, while the immediate activities of the corporation are managed by an executive staff headed by the Managing Director (not a member of the Board). The Executive Committee maintains careful supervision of all work done by the Society and the expenditure of its funds.

MASON H. BIGELOW
New York, N. Y.

Sight Saving*

More and more the public is realizing the value of good sight and is, therefore, accepting the methods and resources of the modern medical specialist in the restoration of sight and prevention of blindness, or "sight saving." Such a program comprises one of the most, if not the most, important phase of the services rendered by the Ohio Commission for the Blind.

With the advance of biological, medical and surgical science, treat-

* Radio address delivered over Station WHKC, Columbus, Ohio, April 15, 1937.

ments and surgical procedures are being performed today which are little short of miraculous in restoring sight to those who are blind or partially blind. Yet how much better and wiser it would be to concentrate our efforts on preventing blindness than to depend upon the medical science of the future to restore sight needlessly lost.

Hereditary Eye Conditions

Sight saving should begin as soon as an infant is born, or, more properly, before birth. It therefore goes without saying that parents are really responsible for the condition of their children's eyes during the first years of their life. There are two classes, or conditions, which must be considered before the child is born. First, there are certain conditions causing blindness which are hereditary; that is, children born of parents blind from certain types of eye diseases, may, in turn, give birth to children who will likewise become blind of a similar condition. The sad part of this circumstance is that some day these blind children will not have their parents to depend upon, and will then be dependent upon whatever provision is available at that time. It does seem more humane for such parents to adopt a normal child, rather than to run the risk of burdening society with a blind one. Elimination of hereditary blindness would greatly reduce the work of agencies for the blind and the number of students in schools for the blind.

Syphilitic Eye Conditions

There is another condition to which I would like to call your attention. That is, syphilitic conditions as they affect the eyes of the newborn infant or occur during youth. Most of these blind children could have had useful or normal sight.

It would only have been necessary for the mother, as soon as she knew that she was to be a mother, to have had a Wassermann or Kahn blood test which would have disclosed the presence of a syphilitic infection if such existed. If syphilis is found to be present at such a time, it still is not too late to start energetic treatment and to give birth to a normal child. There is no mother so rich that she can afford to have a blind child, and none so poor that she needs to do so. And another point to remember is that all syphilis is not venereal, nor venereally contracted. No expectant mother has the right to give birth to a child blind from inherited syphilis because her pride would not permit her to submit to a blood test.

If we could eliminate this type of case—as we could if each expectant mother would co-operate by holding herself properly responsible for the eye condition of her unborn babe—statistics for the next decade would show a marked decrease in

the number of blind infants and children. For this reason we are especially anxious that parents of every walk of life should not allow their pride to cause them to place a false value on the importance of this danger—that they be not too certain that they have not accidently acquired a disease which they might pass on to their children, not to mention the danger of causing serious illness to themselves in later life. There are free clinics in the larger cities and there is the state laboratory which will run the tests for doctors in cases of indigent patients, so that a person's financial status is no reason for not having the benefit of this service which will do so much to safeguard the eyesight of the coming generations. It is much better to play safe than to be sorry; we might apply the slogan of the Better Business Bureau, "Before you invest, investigate." In this case you are investing in the most precious article on earth—human life.

Claude S. Perry, M.D.
Columbus, Ohio.

Note and Comment

New Sight-Saving Classes Established.—According to information received in the office of the National Society for the Prevention of Blindness, 17 new sight-saving classes were established this fall. These classes were opened in the following cities: Pasadena and San Francisco, California; Bridgeport, Connecticut; Blue Island and Cicero, Illinois; Kansas City, Missouri; Buffalo, Elmira, New York, Troy, and Yonkers, New York; Lincoln, Ohio; Chemawa, Oregon; and Wilkes-Barre, Pennsylvania.

A Campaign Against Trachoma.—Trachoma, that dread eye disease the cause of which is unknown, has for decades been prevalent in southern Illinois. Other sections of the state have largely escaped its ravages, but in 14 of the southern counties there has been a steadily increasing concentration of this type of conjunctivitis.

Many of the sufferers live in poverty on isolated farms, and, even though the Illinois Society for the Prevention of Blindness offered to give them weekly treatment, frequently they could not obtain transportation to the Society's clinics.

Obviously, it was necessary to provide not only facilities for treating the disease, but also some means of transportation for the hundreds of rural sufferers. And since the trachoma-infested area comprises some 3000 square miles, this problem of transportation gave the officials their biggest headache.

The problem was solved, however, by the Works Progress Administration.

A project, sponsored jointly by the Illinois Department of Public Health and the Illinois Society for the Prevention of Blindness and put into operation by WPA, now provides 20 bus runs covering the 93 towns in the 3000 square mile area where trachoma is most prevalent.

Besides bringing into the clinics patients from surrounding towns and villages, the WPA buses also pick up trachoma sufferers along the highways and byways of their routes.

To reach the bus routes, the patients walk, ride horses or thumb lifts in wagons or in any other available vehicle. For instance, into the Shawneetown clinic one day stalked an elderly woman dressed in a wrapper and a sunbonnet. She looked as if she had stepped out of a story book of the last century. She had ridden a horse bareback the three miles from her house to the bus line. There she had tied her horse, got in the bus, and traveled 20 miles more to town for her treatment. Afterward the bus took her back, and she unhitched her horse and rode home. She was 69 years old.

Trachoma clinics are in operation at Harrisburg, Vienna, Shawneetown, Herrin, Eldorado and Jonesboro.

Occasionally those clinics are located in somewhat unusual places. In Vienna, for example, a library basement was made available for the trachoma work; WPA renovated it and provided adequate equipment. At Jonesboro an old jailhouse was turned into a clinic; WPA repaired the building and made it suitable for medical work.

About 3000 cases, including several hundred suspected victims, are receiving treatment in the five clinics.

When the disease is not too far advanced, complete cures are possible, and even in extreme cases the progress of the disease may be checked and the advent of blindness at least postponed.

The trachoma clinics are effecting a genuine saving for Illinois taxpayers. Pensions for the blind in Illinois average $5000 a day, according to Miss Audrey Hayden, director of the Illinois Society for the Prevention of Blindness, and the education of a blind child in a state institution costs about $800 a year. WPA funds for bus clinic service amounted to $20,000, to which the state added $25,000 and the Society for the Prevention of Blindness $6,000. Figuring conservatively, if, on an average, blindness in the 1500 patients is postponed one year, the state will save in blind pensions during that year approximately $180,000.

Clinic reports indicate, however, that blindness will be in many instances entirely prevented, and in others indefinitely postponed.

Dr. Walter De François is in charge of the trachoma work in southern Illinois, and Miss Myrtle Chalstrom is supervising nurse.

This campaign against trachoma is merely one of many similar activities of the Works Progress Administration. During the past

two years WPA has initiated scores of health projects. Thousands of individuals have been taken from relief rolls and given employment on sanitation and health projects all over the country. The average number of WPA workers engaged in this type of work has been 78,000.

Seeing Through a Giant Eye.—A circular window, modelled in the form of a human eye, is contemplated as a dramatic exhibit at the New York World's Fair of 1939. Visitors will be able to move levers to reproduce the action of the pupil in changing its dimensions, exactly as does nature. By manipulation of another lever, they will see the panorama as it appears to a myope, or, again, to one who is a hyperope, or to persons suffering from other defects of vision.

Luminous Roads.—Increased visibility of roads has been attained by mixing red or yellow ocher with the road surface material, thus making the road somewhat luminous at night.

American Medical Association Meeting.—The following excerpts from the *Proceedings* of the American Medical Association, Section on Ophthalmology, Atlantic City, June 9 to 11, 1937, are of interest to the National Society for the Prevention of Blindness and to readers of the Review:

"It was moved by Dr. Arthur J. Bedell, Albany, N. Y., duly seconded and carried, that the following resolution be presented to the House of Delegates:

"Whereas, The Federal Social Security Act in Title Ten has placed on the Social Security Board the responsibility of entering into co-operative arrangements with the various states for the purpose of aiding those states in granting financial assistance to needy blind individuals, and has ruled that individuals in the various states applying for blind assistance must be examined by an ophthalmologist or doctor of medicine skilled in the diseases of the eye;

"Whereas, The Social Security Board has advised the official state agencies that have the responsibility of administering this aid in those states to employ a supervising ophthalmologist who will have general supervision over the medical determination of blindness within the state; therefore, be it

"Resolved, That the Section on Ophthalmology of the American Medical Association approves the action of the Social Security Board in requiring that applicants for blind assistance within the various states be examined by a regularly licensed and registered doctor of medicine skilled in diseases of the eye or by an ophthalmologist, as such a procedure will serve to secure a fuller knowledge as to the causes of blindness within the United States; and be it further

"Resolved, That the Section on Ophthalmology of the American Medical Association goes on record as approving the suggestion of the Social Security Board that the official agency in the state or territory charged with the responsibility of administering blind assistance employ a supervising ophthalmologist whose duty will be the general supervision of the medical determination of blindness of those needy individuals applying for blind assistance; be it further

"Resolved, That the delegate from the Section on Ophthalmology of the American Medical Association be and is hereby instructed to present these resolutions to the House of Delegates."

Dr. John Green, St. Louis, read the report of the Committee from the Section to Co-operate with the National Society for the Prevention of Blindness. It was moved by Dr. Harry S. Gradle, Chicago, that the committee be instructed to make an analysis of the statistical tables of the cause of blindness as shown here and be prepared to report to this section at the next session. The motion was seconded by Dr. Arthur J. Bedell, Albany, N. Y., and carried.

Dr. William Henry Luedde, St. Louis, chairman, Dr. Adolph O. Pfingst, Louisville, Ky., and Dr. John W. Burke, Washington, D. C., were appointed to constitute the Committee to Co-operate with the National Society for Prevention of Blindness.

"Don't You Believe It!"—Under this title, August A. Thomen, in a recent *American Mercury*, exposes a number of popular misconceptions, among them the mistaken notion that the wearing of eyeglasses causes one to "get used" to them, and hence their adoption should be delayed as long as possible. He says: "The truth of the matter is that the present perfection of ophthalmology enables science to determine definitely when an individual needs visual improvement through glasses. If it can be ascertained by expert

examination that he does, it is folly to defer the matter for any reason, for glasses are worn for three primary purposes: (1) to prevent symptoms caused by eyestrain, or to correct them if they have developed; (2) to prevent further impairment of vision, and (3) to increase one's efficiency. It is not a question whether the wearer will 'get used' to the glasses, but whether he needs them to improve vision."

Westchester Safeguards Vision.—Beginning in 1934 a bi-weekly eye clinic has been held in Mt. Kisco by the New York State Commission for the Blind in co-operation with the Northern Westchester District Nursing Association. During the three years of the clinic's existence 76 clinics have been held, with a total attendance of 1,949 and a registration of 693 patients. Glasses have been prescribed for 404 patients, of whom 198 were adults. Eye muscle training, which is largely given in classes held regularly by the specialist in this work, has been recommended for 247.

Figures that Speak!—During the five years from 1931 to 1935, inclusive, the New York State Department of Labor awarded nearly $134,000,000 compensation on 395,000 occupational injury cases. Although eye injuries constituted only 2 per cent of the cases, they were granted 4 per cent of the compensation. These figures bear out the general impression that injuries to the eyes are about twice as serious as the average compensated injury.

That He Who Phones May Read.—Time was when a siege with the Manhattan Telephone Directory would send many a New Yorker into despair. Read, as it usually is, under dim illumination and in crowded corners, it made excessive demands on the vision. Faced with the necessity of printing in small type, with unleaded lines, in order to accommodate a large number of names, the New York Telephone Company had only one method of improving the legibility of its directory—through the use of a specially designed type face. This new type face, lighter in weight and simpler in form than that which has been used for the past twenty years, appeared for the first time in the Fall, 1937, issue of the directory and immediately won the enthusiastic approval of subscribers.

Mellow Lighting.—To provide bright but non-glaring light at a particularly dangerous railroad crossing the Bethlehem Steel Company has installed at its Lackawanna, N. Y., plant four sodium luminaire lighting units. The mellow orange-yellow light thus not only provides good visibility, but, by its characteristic color, suggests danger, and hence serves as a warning signal.

Vision Tests for Drivers.—The importance of the health of automobile drivers is only slowly becoming apparent to the courts of the country, according to Dr. Byron Stookey, who suggests in a recent article in *Medical Economics* that more rigid and more frequent physical examinations should be required of all drivers. Good vision is particularly important to a driver, and, as this may readily be impaired in the course of a few years after a license is granted, it is highly important that frequent check-ups be made.

Trapped Sunlight.—Flying over Paris one day, the distinguished French engineer, Pierre Arthuys, was so impressed at the contrast of roofs bathed in sunlight with the darkness of the streets below that it occurred to him that the sun rays wasted on the roofs might be trapped and reflected by means of mirrors into the dark rooms below. From this idea was born the Arthel Heliostat, a useful device, consisting of one mobile and one fixed mirror and two small electric motors controlled by two thermostats. The big mobile mirror, facing skyward, is mounted on a pivot slowly moved by a motor through the arc of a circle, from east to west, thus following the sun in its path. The seasonal movement as well as the daily movement is imparted to the mirror by an ingenious clutch and differential gear, so that every hour on every day of the year, in no matter what latitude, the master mirror is always directly facing the sun and ready to trap on its four square yards of polished glass its full quota of 400,000 lumens.

The heliostat not only saves 35 to 85 per cent in electric light, according to the latitude, but it offers wonderful possibilities for luminous interior decoration effects, and, most important of all, it provides a daily supply of sunlight, one of the most powerful healing agents and germicides known to science.

"Better Sight" Engineer Honored.—Beginning October 1, 1937, following the Convention at White Sulphur Springs, West Virginia, of the Illuminating Engineering Society, Henry B. Dates, Professor of Electrical Engineering at the Case School of Applied Science, Cleveland, will begin his term as president of the Society. Professor Dates has a distinguished record of both academic achievement and practical experience. Perhaps his most signal contribution to lighting was his development of the I. E. S. "Better Sight" Lamp, for which he and his I. E. S. Committee on School Lighting developed the original specifications, as well as the present method of certifying I. E. S. approved lamps. This lamp, hailed as "the first package of Better Light—Better Sight" has practically revolutionized portable lamp design, and has provided a new era of comfort and safety for students and others who depend on portable lamps for sight saving illumination.

Sight Saving in Nebraska.—A survey of social resources in Nebraska, which has been issued in the form of a WPA project, gives considerable attention to the methods of preventing blindness through the agencies of the State Health Department, the State Department of Public Instruction, and the State Department of Labor. Through the control and prevention of infectious diseases, the promotion of education, and the establishment of health clinics and sight-saving classes, an effort is made to minimize the increase of blindness. The report indicates, however, that this is but an outline of the ideal which is aspired to but which is by no means attained.

Glass Bricks and Modern Lights.—An interesting use of glass bricks, which has been hailed by some engineers and architects as offering a more diffused and less glaring light than plate glass, has been made in the Swedish Hospital in Seattle, Wash. They are used to form the walls of the operating suite. From pictures of the result it appears that the room is practically shadowless, about the only contrast being between the relatively low wall brightness and the brightness of the bricks. This indicates that while the transmission factor of the glass is extremely high, its brightness is relatively low, which, from the standpoint of good lighting practice, is an aid to eye comfort.

In Iowa City, the *Press Citizen* has erected its new modern building with glass brick panels providing adequate daylight throughout the exterior, and with a system of indirect lighting in the interior, thus exemplifying the latest trends in lighting for an up-to-date building.

Lighting has been handled effectively throughout this new building for the utmost in efficiency and beauty. The entire lighting system is indirect and represents a total wattage of 55,500. Light which shines from behind light Wedgwood blue, and deep coral panels which run the north and south length of the ceiling, comes from a concealed system. Alcoves on each side of the entrance of the interior are illuminated by modern units lighted indirectly with metal louvers. Lighting in the news room and advertising office has been accomplished by the use of nine 200-watt units in each room. The fixtures, which are for full indirect lighting, are chromium finished and are suspended two feet from the ceiling. Smaller offices are lighted by 750-watt units. The mechanical department is lighted by means of 48 200-watt glass steel diffusers, which eliminate glare, yet give a direct light on make-up tables, linotype machines and other equipment.

Universities Offer Eye Courses.—"The Survey of Eye Conditions" course will be offered this year at the New York University, Washington Square, and Teachers College, Columbia University. These eye courses are open to teachers, social workers, public health nurses and school nurse-teachers, also workers from allied fields. The purpose is to acquaint all groups with the development and preservation of normal vision and the care of the eye in disease, in order to prevent further deterioration of sight. Courses at both universities receive two points of credit each semester. New York University classes are held Fridays, 6:15 to 8:15 P.M. Teachers College classes are held Friday evenings from 7:30 to 9:10.

Both of these courses are sponsored by the State Department of Social Welfare, Bureau of Services to the Blind, Prevention of Blindness.

The Myopia Problem.—A report on myopia by Mr. Bishop Harman at the Ophthalmological Congress held at Oxford early in

July indicates that myopia is largely the result of environment. The chief arguments for such a conclusion are: myopia is more prevalent in girls, who do much fine work, than in boys; the defect occurs most frequently in poorer sections of the community; and further, statistics on the subject reveal no family history of myopia in 67 per cent of the cases of high myopia under consideration. This last argument was countered by Mr. Arnold Sorsby, who claimed that the statistics quoted by Mr. Harman support the view that myopia is a recessive hereditary characteristic.

The arguments in favor of environment as the cause of myopia cast a hopeful ray of light on its possible solution by proper care of the eyes. Evidence from Sweden shows that the introduction of an advanced system of school hygiene has reduced the incidence of myopia in that country.

Retina Prints for Identification.—A method of identification which would provide a valuable supplement to the present use of fingerprints and dentitions has been devised by Dr. Carleton Simon, criminologist of the International Association of Chiefs of Police, who has developed a method of identification by means of the blood-vessel patterns in the retina. In 1935 Dr. Simon described, with Dr. I. Goldstein, a method of classification based on a retinal protractor, with the optic nerve as its center. He uses only the vein pattern, because the arteries, being lighter in color, are not definite enough. The zero axis is a line drawn from the center of the papilla to a point 10 mm. distant on the superior temporal vein, and the notation describes the angles at which veins or branches intersect two circles, one of 10 mm. and the other of 5 mm. radius. His system, which has been gradually simplified in use, needs a minimum of figures and can, he says, be mastered in a couple of hours. This method of identification as an adjunct to fingerprint identification in certain cases sounds promising, and scientists will look forward to further proof of its practical value.

Detroit Hopes to Decrease Night Traffic Accidents.—It has been announced that 3000 new incandescent street lights will replace outmoded arc lamps on several main streets in Detroit. The new units are expected to give about six times as much street illumination as

the old arc lamps, and are being installed as a major part of a $400,000 program for the general improvement of Detroit's street lighting to decrease night traffic accidents.

On 31 miles of streets on which the nighttime visibility was recently increased through modernized lighting, the night-to-day traffic fatality ratio was lowered from 7 to 1 to the present ratio of 1.25 to 1. On seven miles of improved lighting in service for eight months, only one night fatality and one day fatality have occurred —a great improvement over the record of 10 night fatalities and one day fatality on the same seven miles for eight months prior to the installation of improved lighting.

What Price Eyes!—The largest social insurance scheme in China is six months old and has 41,000 members—all ricksha pullers for the Shanghai International Settlement. At a premium of only one cent a shift, the pullers are insured against death or disability, with an indemnity of $40 assured in case of death or $20 for the loss of an eye.

Illinois Society Holds Three-Day Eye Institute.—The second institute on conservation of the eyesight of school children was presented by the Illinois Society for the Prevention of Blindness in a four day session, August 30–September 2. The program included several lectures on methods of protecting vision in school children, as well as a visit on September 1 to the House of Vision, where lectures were given by Hugh Hunter and John Kerry of the Belgard-Spero Optical Co. on the grinding of lenses, and a visit on September 2 to the Orthoptic Clinic at the Illinois Eye and Ear Infirmary, where clinical instruction in diseases of the eye was given. The lecturers included Dr. William Benedict, head of the department of ophthalmology at the Mayo Clinic, Rochester; Dr. Thomas Allen, president of the Chicago Ophthalmological Society, Dr. Philip A. Halper, associate, department of ophthalmology, College of Medicine, University of Illinois; Dr. George P. Guibor, assistant ophthalmologist at Children's Memorial Hospital; Anette M. Phelan, associate in education, National Society for the Prevention of Blindness; Eleanor Hearon, medical social eye worker at Billings Hospital; and Marjora Garrity, educational consultant for the Illinois Society for the Prevention of Blindness.

Basque Refugee Children.—One of the most appealing and significant episodes of the Spanish War has been the flight of 4090 children from Bilbao and the surrounding countryside to England where they are being cared for now. A great deal of interest has been manifested, for obvious reasons, in the physical condition of these children. In response to the inquiry regarding their medical inspection, made by Dr. Andrew MacCallan, who feared that trachoma might be reintroduced into England, there have been several articles printed describing the procedure in detail. Every precaution was taken to avoid importing any infectious disease. The children were examined at the start as well as at the end of the trip. Each child who leaves the camp where he is cared for, for a temporary home in England, will have had a minimum of three full medical examinations. The two cases of trachoma which were found were not permitted to embark, and an ophthalmic surgeon with considerable experience in the diagnosis of trachoma sees all eye cases.

It is surprising to note that the medical officers found that a large majority of the children showed no marked sign of malnutrition, although most of them had for months lived in Bilbao on fish and black bread and had spent the days and many nights herded together in bomb-proof shelters. The public medical service in this particular province of Spain, according to the information obtained from the two English medical officers, is of a very high standard. Many of the children were thin, but the general impression gained, especially before they were stripped, was that they were, on the whole, an alert, intelligent group of children who compared favorably in physique with English children.

World's Fair Health Congress.—In the plans being made for the holding of an International Health Congress during the New York World's Fair in 1939, advantage will be taken of the fact that hundreds of noted medical specialists and public health authorities, representing many countries, will be visiting New York City at that time. American and foreign specialists will be asked to deliver addresses on subjects of interest not only to professional groups, but to the general public as well.

Plans for the 1939 sessions are being perfected by the National

Health Council in collaboration with the World's Fair Advisory Committee on Medicine and Public Health, which is headed by Dr. Louis I. Dublin. The program will be related, as much as possible, to the exhibits on medicine and public health that will be on display at the World's Fair.

It is expected that speakers and exhibits will be concerned more with the problems and methods of preventing ills than with technical aspects of the treatment and cure of disease. Some of the subjects that will be discussed are indicated by the following list of active member agencies in the National Health Council: American Society for the Hard of Hearing, Inc.; American Heart Association; American Public Health Association; American Red Cross; American Social Hygiene Association; American Society for the Control of Cancer; Conference of State and Provincial Health Authorities of North America; Maternity Center Association; National Committee of Health Council Executives; National Committee for Mental Hygiene; National Organization for Public Health Nursing; National Society for the Prevention of Blindness; National Tuberculosis Association.

The United States Children's Bureau and the United States Public Health Service are advisory members of the Council. The American Nurses' Association and the Foundation for Positive Health are associate members.

Visual Educators Convene.—Three significant trends marked the National Conference on Visual Education held in Chicago, June 21–24, 1937: (1) The interest shown by the U. S. Government in the Conference, as indicated by the active participation of three Government departments, which sent both their films and official representatives; (2) the surprising growth of filming by amateur groups; and (3) the recognition, by the Press, of the Conference as an important factor in furthering modern educational programs.

Molded Plastic Reduces Cost of Lenses.—Satisfactory spectacles selling at less than one dollar a pair are now said to be possible through the development in England of "Perspex," a transparent plastic which may be molded into lenses with an accuracy of 1/500,000 of an inch, which is ten times the accuracy required in

spectacles. The tremendous economy in manufacture readily offsets the disadvantage of the shorter life of the plastic lenses, which scratch easily and lose their shape when exposed to high degrees of temperature. The greatly lowered cost would have a great effect in conserving vision by making it possible to supply free glasses to school children and enabling all who require glasses to purchase them.

Sliding Scale for Vision Standards.—A varying standard for vision, according to the demands of the work, is recommended by the *British Journal of Ophthalmology*, in view of the fact that relatively few workers possess perfect vision, although in other respects they may be highly competent. It is obvious that an agricultural laborer does not require so high a standard of vision as a railroad engineer. It is suggested that a sliding scale of standards recorded by Snellen's test types be adopted and that long experience in any particular work may well outweigh a defect in vision. Of course, in cases where the defect is of such a nature as to endanger the safety of the worker as well as of others, it is advisable for him to make a suitable change in his occupation.

Dr. de Lapersonne Dies at 84.—A life marked with distinguished achievements in the advancement of ophthalmology came to an end with the recent passing of Félix de Lapersonne, first president of the International Society for the Prevention of Blindness. His work in organizing and developing the Society was recognized in 1934, when he was awarded the Leslie Dana Gold Medal. He had previously been honored by election to the French Academy of Medicine, of which he became president in 1931. That same year he had conferred upon him the rank of Commander of the Legion of Honor. He will be remembered not only for his brilliance and skill as an ophthalmologist but for his genial personality, which won all who had the privilege of meeting him.

Back Numbers of Sight-Saving Review Needed.—The *Sight-Saving Review*, having exhausted its supply of Volume I, Number 3, Volume VI, Number 2, and Volume V, Number 3, will be glad to receive these issues from subscribers who have no further use for them. A refund of 50 cents will be paid for each copy returned.

National Society Notes.—During the past summer the Society co-operated in the conduct of training courses for sight-saving class teachers and supervisors at Western Reserve University, Cleveland; Wayne University, Detroit; and State Normal School, Buffalo. At Western Reserve, in addition to the usual elementary course, an innovation was made this year by offering an advanced course which was directed by Mrs. Winifred Hathaway, associate director. The total registration at these centers was 98, an increase of 13 over last year, which had been the largest to date. In keeping with its policy of undertaking this work for a limited period, as a demonstration, the Society did not participate with Teachers College, Columbia University, which this year took over the work. The Society, however, co-operated by giving preliminary assistance to the instructor of the course and by providing publications to the twenty students enrolled. Other staff members active in the summer courses were Mr. Lewis H. Carris, managing director; Miss Anette M. Phelan, Ph.D., staff associate in education; and Mrs. Francia Baird Crocker, R.N., associate for nursing activities.

Since June 1, 27 cities in the following states and Canada were visited by staff members attending conventions, rendering consultation service and filling speaking engagements: Kansas, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania, Utah, and Vermont. Suggestive of such field work is the trip by Mr. Carris in connection with the recent organization of the Kansas Society for the Prevention of Blindness. On a planned schedule arranged by the executive secretary of the local agency, who had previously spent some time at the National Society's headquarters consulting the staff regarding organization methods, Mr. Carris presented the subject of sight conservation at meetings or over the radio in the following cities: Independence, Kansas City, Lawrence, Pittsburg, and Wichita. Among other responsibilities placed upon Mr. Carris was his appointment by Mayor LaGuardia as a member of the local sponsoring committee for the annual meeting of the American Public Health Association, and, further, his appointment as a member of the Committee on Conservation of Sight at the World's Fair, to be held in New York City in 1939. Mr. Carris, American correspondent of the International Association for the Prevention of Blindness, will, upon invitation, present

a paper written jointly with Mrs. Eleanor Brown Merrill, associate director, on the subject of "The Rôle of the Social Worker in a Prevention of Blindness Program," and Dr. Park Lewis, vice-president, will discuss "The Responsibility of the Ophthalmologist in the Conservation of Sight and the Prevention of Blindness," before the forthcoming annual meeting of the International Ophthalmological Society, December 8–14, 1937.

Eight universities and teachers colleges were visited by Dr. Phelan, whose lectures reached groups ranging in size from 20 to 500. One of the results is the inclusion of an eye health program in a selected group of the public school system in Delmar, New York. At Cornell University consultation service was given in connection with a project for the vision testing of 1500 incoming freshmen, by means of the Ferree and Rand testing instrument and the routine Snellen chart tests, for the purpose of comparing the results of these two procedures. In response to an urgent request, Dr. Phelan will present, during the 1938 summer session, a course at the University of California, for the preparation of instructors in teacher training colleges.

Mrs. Merrill has been directing her attention to the newly formed Interorganization Committee on Sight Conservation, on which she is the National Society's representative. The Committee comprises representatives from the following organizations: American Public Health Association; American Public Welfare Association; Children's Bureau; Social Security Board; State and Provincial Health Authorities of North America; U. S. Public Health Service; National Society for the Prevention of Blindness; American Academy of Ophthalmology and Oto-laryngology. The purpose of the Interorganization Committee is to demonstrate the possibilities of making state-wide prevention of blindness a part of the program of state health departments.

Under the auspices of the New York Tuberculosis and Health Association, Miss C. Edith Kerby, statistician, gave a radio talk entitled "Insure Your Eyes"; and Mr. Theodore O. Yoder, membership secretary, spoke on "Keeping Well Eyes Well."

Mr. David Resnick, director of publicity, was asked to participate in the session on "Public Health as a Source of News" at an

institute to be held in connection with the annual meeting of the American Public Health Association.

The Society's film, "Preventing Blindness and Saving Sight," was requested for use in 14 states and Canada, and was shown to an estimated audience of 20,000. Exhibit material was supplied in the form of 37 mounted displays and loans from the Society's collection of original exhibit units. Among the fairs served were: Oakland County Department of Health (Michigan); the Indiana State Medical Association; Owsley County (Kentucky); Autryville (North Carolina); and the South Carolina State Fair.

The Society announces with regret the resignation of its associate for nursing activities, Mrs. Francia Baird Crocker, R.N., whose marriage to Mr. Francis J. Carr took place recently. Mrs. Carr's resignation will not be effective until some time after December 1, and it is hoped that she may be prevailed upon to extend her time for special services beyond that date.

Current Articles of Interest

The Spermine Bases of Ocular Tissues, Arlington C. Krause, M.D., *American Journal of Ophthalmology,* May, 1937, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. A discussion of a quantitative analysis of the spermine and spermidine found in the fresh ocular tissue of an ox. It is illustrated by a chart revealing the proportions of wet and dry spermine and spermidine in bovine conjunctiva, sclera, corneal epithelium and stroma, choroid, iris, vitreous humor, retina, optic nerve, and brain. It is concluded that these substances take a part in some unknown important physiological function of active metabolic tissues.

Effect of Fatigue on the Adjustment of the Eye to Near and Far Vision, C. J. Robertson, M.D., Commander Medical Corps, United States Navy, *Archives of Ophthalmology,* May, 1937, published monthly by American Medical Association, Chicago, Ill. This is a detailed study of tests made with the tachistoscope on pilots ranging in age from 20 to 50 years. The text is copiously supplemented by charts, in which the subjects are studied by age groups of five years. The purpose of the experiments was to establish a standard of speed with safe limitations in five-year age groups of the three phases of adjustment of the eye to near and far vision, with particular reference for use in aviation. The reasons, including age, for the speed of accommodation being outside these limitations are demonstrated. Conclusions reached by the author are as follows:

Age has a marked bearing on the speed of adjustment of the eye to clear seeing at different distances.

With any anomalous conditions of the eye the factor of age becomes of greater importance. After the age of 30 the change becomes rapidly more marked.

Various anomalous conditions of the eye, such as were noted in the discussion of the tests that demonstrated speeds below the limits of safety, are, in part, the cause of the slowing of the speed.

Aviators with speed of adjustment not within the limits of safety should be disqualified physically until such time as adjustment can be made, or permanently if it is found that they cannot make the adjustment.

Fatigue has a marked bearing on the speed of adjustment in all ages, more notably as age progresses.

Fatigue other than that caused by flying can be tested by this method.

The study of fatigue and of the time of recovery is an important phase of this work as yet untouched.

Aniseikonia: A Clinical Study, Guerdan Hardy, M.D., *American Journal of Ophthalmology*, June, 1937, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. In a clinical study of 34 patients, mostly young adults, with an age range of 17 to 56, the following results were attained:

1. Some patients are benefited by the addition of a size lens to the dioptric correction. The percentage aided, however, has been less than that reported from other clinics.
2. The size differences of a symptomless group of persons wearing corrections for errors of refraction were equal to the size differences of those seeking relief from asthenopia.
3. Not infrequently the dioptric correction is altered at the time the iseikonic lens is prescribed. Obviously, when this occurs, it is not possible to determine, with any assurance, which change is helpful.
4. The muscle balance was not appreciably influenced by the iseikonic lenses.
5. Vertical size determinations were made with greater ease than lateral ones, that is, the patient had less difficulty in making comparisons.
6. The chief objection to the method employed is that it is tedious, tiresome, and difficult for the patient.
7. Sufficient numbers of symptomless individuals should be examined in order to determine, if possible, what a normal size difference would be.
8. Those prescribing iseikonic lenses should avoid incorporating other changes; that is, a change in the strength of the lens should

be made before the size correction is prescribed and not at the same time. Otherwise accurate deductions are impossible.

Chemical Conjunctivitis of the Newborn: Its Cause, Prevention, and Treatment, Lewis Pellman Glover, M.D., *Pennsylvania Medical Journal*, September, 1937, published monthly by the Medical Society of the State of Pennsylvania, Harrisburg, Pa. This study of the effects of silver preparations used to prevent ophthalmia neonatorum reveals that stale preparations often cause severe irritation to infants' eyes. In a few cases both eyes were lost through severe ulceration. The method of treatment consisted of scrubbing the palpebral conjunctiva with boroglyceride on an applicator until it bled. A weak zinc solution was ordered three or four times a day, preceded by boric acid irrigations, and cold compresses were used every three hours. No silver of any type was permitted. The grattage was repeated every four days. This treatment always cured the condition in from one to three weeks, as noted by the return of a healthy conjunctiva and no discharge.

Light Adaptation at the Macula, Edmund B. Spaeth, M.D., *Archives of Ophthalmology*, August, 1937, published monthly by the American Medical Association, Chicago, Ill. This article describes the work done in the Wills Hospital for the National Brotherhood of Railway Firemen and Enginemen, as a result of the claim of firemen before the Interstate Commerce Commission that the effects on their eyes of the illumination from the firebox made it impossible for them to see the signals and call them properly.

The laboratory work which had to be done in connection with this problem was: (1) simulation of the illumination of a fire box; (2) adaptation of persons to this illumination; (3) the simulation of a three point signal light with its illumination corrected for various distances, and (4) the determination of the effects of the illumination of the fire box on an observer's reaction time for finding and for calling the simulated three point position signal light.

The findings of the tests show the effects which varying degrees of illumination have on the macular region and indicate that increasing the illumination does not increase the efficiency of dis-

crimination proportionately. The work was undertaken simply as an application of laboratory methods in an attempt to solve a serious industrial problem which can have a far-reaching effect both in safeguarding the lives of railroad passengers and in making necessary or unnecessary the expenditure of huge sums of money by the railroads for equipment not considered by some a definite necessity.

Book Reviews

HEALTHFUL LIVING. Harold S. Diehl, M.D., New York: Whittlesey House, 1935. 354 p.

In this book on health, unique in that it is interesting, the author discusses with frankness the fundamentals of healthful living. The chapter on vision is informative and the well-selected facts are clearly and simply presented.

The excellent section on farsightedness might have been extended profitably to include data indicating the incidence of true farsightedness in the age periods of adolescence and early maturity. The discussion of squint, likewise, might have been strengthened by a consideration of the significance to depth perception of squint in early childhood.

The brief section on illumination, unfortunately, omits mention of glare, a problem of equal importance with intensity to visual efficiency.

ANETTE M. PHELAN, PH.D.

Briefer Comment

THE NATIONAL HEALTH COUNCIL, INCORPORATED: STATEMENT OF MEMBERSHIP AND ACTIVITIES, 1937–1938. 36 p.

Comprising a summary of the organization, objectives, services, and future plans of its member organizations, the booklet presents concise comment on the achievements and aspirations of these various health agencies.

A HEALTH EDUCATION WORKBOOK. Kathleen Wilkinson Wootten. New York: A. S. Barnes & Company, 1936. 280 p.

This attractive, paper-bound book, designed for teachers, parents, nurses, and social workers, presents an excellent outline for the study of health education. Particularly notable features are the exhaustive bibliographies at the end of each chapter, the clean-cut details of the charts, and the comprehensive new type test summarizing the salient points covered in the text.

EDUCATION IN THE KINDERGARTEN. New York: American Book Company, 1936. 368 p. Ill.

A thorough discussion of the problems peculiar to the teacher of kindergarten children is here presented in a readable and well-illustrated form. Attention is called to the lighting of the kindergarten, with suggestions that the window area be at least one-fifth of the floor area and that the walls be painted a soft shade of tan or green to provide a pleasing light. The testing of vision by means of the "E" chart is recommended, and the detection of traits peculiar to children with defective vision by the use of a behavior test compiled by Dr. Anette M. Phelan, of the National Society for the Prevention of Blindness, is suggested.

TEACHING HIGH-SCHOOL STUDENTS TO READ. Stella S. Center and Gladys L. Persons. New York: D. Appleton-Century Co., Inc., 1937. 168 p. Ill.

A detailed study of the progress of high-school students of inferior reading ability is presented, with numerous charts and illustrations. An analysis of the causes for poor reading shows that low native ability, the use of a foreign language at home, and personality disturbances are more predominant than actual defects in vision. The remedial program includes tests made with the ophthalm-o-graph, a camera which photographs movements of the eye in reading, and the use of the metron-o-scope, an instrument designed to train the eye muscles to react rhythmically.

SOCIAL WORK YEAR BOOK, 1937. Russell H. Kurtz, Editor. New York: Russell Sage Foundation, 1937. 710 p.

This third edition of the *Social Work Year Book* is thirty pages larger and includes a 540-page encyclopedia of topical articles ranging from "Accidents" to "Zoning." In addition, it includes a directory of agencies, listing pertinent facts about their work. In a book so excellently edited, it is regrettable that "Prevention of Blindness" is listed under the general heading "The Blind," since joining them in this way adds further to the confusion as to the distinct entity of each of these phases of social welfare work.

Healthy Growth. Martha Crumpton Hardy, Ph.D., and Carolyn H. Hoefer, M.A. Chicago: University of Chicago Press, 1936. 360 p.

This is a report of a detailed investigation, over a twelve-year period, of 400 school children, comparing the development of those receiving health instruction with that of an uninstructed group. Phases of development discussed include physical and mental growth, school progress, and behavior adjustment. Numerous charts elucidate the text.

An Introduction to Public Health. Harry S. Mustard, M.D., New York: Macmillan Co., 1936. 250 p.

While this volume does not present new factual material, it is valuable in that it combines in one book a great deal of material which was previously available only through many scattered sources. It is especially good in its discussions of the work of the U. S. Public Health Service, including a survey of the significance of vital statistics. Special emphasis is laid upon the preventive aspects of disease and upon the detection and correction of physical defects in school children.

Squint Training. M. A. Pugh, M.R.C.S., L.R.C.P. London: Humphrey Milford, 1936. 118 p. Ill.

This clearly organized and well illustrated book presents an up-to-date discussion of the newly modified apparatus and new technique in developing binocular vision and correcting a deviating eye. The academic side of strabismus is not dealt with, as the book aims only at giving a practical classification of cases, an accurate method of measuring the deformity, and the technique of treating squint.

Books Received

OCCUPATIONAL LIFE: A WORK GUIDE FOR STUDENTS. Verl A. Teeter. New York: McGraw-Hill Book Company, Inc., 1937. 140 p.

EDUCATION OF THE BLIND: A SURVEY. London: Edward Arnold & Co., Ltd., 1936. 344 p.

YOUTH-SERVING ORGANIZATIONS. M. M. Chambers. Washington, D. C.: American Council on Education, 1937. 328 p.

MANUAL OF THE DISEASES OF THE EYE. Charles H. May, M.D. Baltimore: William Wood and Co., 1937. 500 p. Ill.

Current Publications on Sight Conservation

Note.—The National Society for the Prevention of Blindness presents the most recent additions to its stock of publications. Except for the more expensive ones, single copies are sent free upon request. Unless otherwise specified, they are reprinted from *The Sight-Saving Review*. New publications will be announced quarterly.

245. Proceedings. 136 p. $1.00. Proceedings of the Annual Conference of the National Society for the Prevention of Blindness, December, 1936.

246. Saving Eyesight in Industry. 40 p. 25 cts. Proceedings of the Industrial Session, the Annual Conference of the National Society for the Prevention of Blindness, December, 1936. A reprinted section of Publication 245.

247. Eye Conditions Prevalent in School Age, Joseph E. Golding, M.D. 12 p. 10 cts. The factors causing defective vision in children of school age may be listed as heredity; prenatal disease; defects in the shape of the eyeball; focal infections; childhood diseases; and accidents, according to the author, who discusses these subjects in this article.

248. Motor Vision in Safe Driving, Alvhh R. Lauer, Ph.D. 8 p. 5 cts. The author lists the following eye defects as contributing to motor accidents: reduced field of vision, ocular dominance, blinding from glare of headlights, poor distance judgment, scotomata, and general inattention in driving as brought on by eyestrain.

249. Suggested Regulations for Lighting Sight-Saving Classrooms. 8 p. 5 cts. This article was prepared by a committee called by the Ohio State Department of Education to ascertain the quality and quantity of lighting for comfortable, efficient, and economical classroom use by pupils in sight-saving classes. The committee consisted of sight-saving class specialists, oculists, lighting experts, and school directors.

250. The Social Service Aspects of Refraction, Jeanne Wertheimer. 8 p. 5 cts. The methods of procedure in getting glasses for patients who need them and for getting patients who need glasses to wear them are described by the head social worker of a large ophthalmological institute.

251. The Ear, Nose, and Throat in Relation to Blindness, J. H. Sulzman, M.D. 4 p. 5 cts. Dr. Sulzman points out in this article how ear, nose, and throat specialists do their part in preventing blindness by treating the various focal infections which can, if allowed to progress, affect the health of the eye.

D101. The Right of Sight, Gabriel Farrell, M.D. Reprinted from *Hygeia*, July, 1937. 4 p. 5 cts. A popular presentation of some causes of blindness and how they may be checked.

D102. Contact Glasses, James E. Lebensohn, M.D. Reprinted from *Hygeia*, August, 1937. 2 p. 5 cts. Dr. Lebensohn presents a comprehensive description of contact, or sometimes called invisible, glasses and tells in what cases they may be used to correct visual defects.

D104. Syphilis in Relation to the Prevention of Blindness, Conrad Berens, M.D., and Jacob A. Goldberg, Ph.D. Reprinted from the *Journal of the American Medical Association*, September, 1937. 16 p. 10 cts. This article, read before the Section on Ophthalmology at the 88th Annual Session of the American Medical Association, describes a study of 100,000 case records from five important eye institutions in New York City.

D105. Your Eyes and Your Patient's Eyes, Francia Baird Crocker, R.N. Reprinted from the *American Journal of Nursing*, August, 1937. 4 p. 5 cts. The author points out the responsibility of the graduate nurse of knowing the relationship of general health and eye health and of using her knowledge in increasing the comfort and welfare of her patients.

D106. A School Program for Eye Health, Francia Baird Crocker, R.N. Reprinted from *Public Health Nursing*, January through June, 1937. 20 p. 10 cts. A primer for school nurses and teachers who are charged with the responsibility of vision testing of school children.

D107. Daylighting the Schoolroom, Anette M. Phelan, Ph.D. Reprinted from *Childhood Education*, September, 1937. 8 p. 5 cts. Some points on getting the best daylight in the classroom, including the arrangement of desks, use of shades, and elimination of glare.

D108. Wider Horizons for the Preschool Child, Francia Baird Crocker, R.N. Reprinted from *Public Health Nursing*, September, 1937. 2 p. 5 cts. The author presents facts to substantiate the advisability of examining the eyes of preschool children.

Contributors to This Issue

Dr. Joseph E. Golding is a practising ophthalmologist in Brooklyn, N. Y.

As Associate Professor of Psychology at the Iowa State College, **Dr. Alvhh R. Lauer** has worked on the problem of psychological as well as physical causes of accidents in automobile driving.

Miss Jeanne Wertheimer is Head Social Worker of the Institute of Ophthalmology at the Presbyterian Hospital, New York.

Dr. J. H. Sulzman is a practising ophthalmologist in Troy, N. Y.

Dr. Park Lewis is vice-president and **Mrs. Winifred Hathaway** is associate director of the National Society for the Prevention of Blindness.

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The Sight-Saving Review

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Syphilis of the Eye as a Factor in Industry*

Park Lewis, M.D., F.A.C.S.

THE author recommends a paraphrase of the old war-cry of Cato, Syphilis delendum est (Syphilis must be destroyed), as a slogan for a campaign for reducing accidents in industry and for reducing the number of blind and visually handicapped from this disease.

AN industrialist who is one of the largest employers of labor in this country, recently asserted that future gains in industry would not result from lowering wages nor the limiting of production but from improvements in machinery and keeping those machines that were in use in the highest state of efficiency. The small savings that may be thus effected can constitute the whole margin of profit in this age of keen competition. The most important machine in any factory is the man who runs it. Life today is going at great speed. For a man who is in charge of a powerful piece of mechanism such as a railroad engine with a heavy train behind it, it is absolutely essential that he shall have good sight and quick mental reactions. This of course is equally true of every truck driver and of every air pilot.

It is not at all unusual for trains with twelve or fifteen cars attached to cover long stretches of the road at the speed of a mile a minute. The momentum of these great masses of matter is such that they cannot be stopped, without considerable shaking up of the passengers, within less than a mile. That is equivalent to 1300 feet in 15 seconds. The engine man, consequently, must keep his eyes on the signal lights as they appear. On such a run, the eyes of the engineer must not leave the road. Such concentrated effort

* Presented at the Section of Industrial Hygiene, Public Health Nurses, and National Society for the Prevention of Blindness, Wednesday, October 6, Annual Meeting of the American Public Health Association.

cannot be long maintained so that the hours of each run, before relief comes, are comparatively short. It will be evident, then, in such a position of responsibility that not only must the sight and hearing be adequate, but the mental and muscular responses must be immediate. Anything that can affect these responses should receive attention.

Neurosyphilis is a condition in which the nerve centers and the nerve structures are especially affected and all the reactions are slowed down. An examination with the vision card may show no apparent loss of sight, but the visual and auditory nerves of a man with neurosyphilis become dulled. When tested with the colored wools, he will pick out the stronger primary colors—greens and yellows and blues—he hesitates over the reds. Red is the danger signal. He confuses it with the drabs. His responses to a like test made a year before were immediate. His reading glasses which may have been properly chosen for him, are becoming inadequate. He is requiring more light for seeing to read. Occasionally, on looking at distant objects, he sees double. His eyes have what writers call a "steely" cast, that is, the pupils are small and do not enlarge readily when the light is dim as they normally should, or perhaps the pupil of one eye is large and black while the other is smaller than usual. In the latter case he will have periods of abstraction in which he will seem to be thinking of something other than the matter in hand, or fail to hear when spoken to. At times he will look without seeing and listen without hearing.

These are some of the fortunate early symptoms of syphilis involving the nervous system, fortunate, because they are some of the premonitory symptoms that, unless controlled by proper treatment, will inevitably lead to incurable organic changes. They may anticipate these later changes by months or even years. There may be no indication in casual conversation that the subject of the slowly oncoming changes is other than in perfectly normal health, but this is the time in which treatment may still be successfully employed.

Shortly the pupils will become fixed and small. One eye may turn out. The double vision which may have been present, will become less troublesome because the sight will have grown less and the optic nerve atrophied. The feet will no longer feel the ground

in walking and a stick will be necessary for balance and support. Then locomotor ataxia will be fully developed, or, should the brain receive the greater amount of damage rather than the spine, unwarrantable optimism, cheerfulness, delusions of grandeur will be followed by ultimate dementia. It has been estimated that there are at least 50,000 people in the United States suffering from locomotor ataxia in advanced form. Twice in the writer's experience highly intelligent men, who had filled important positions, and who lacked the courage to meet blindness and physical incapacity, sought relief in suicide.

To industrialists, then, it is of first importance to know that syphilis is a constitutional disease, of which those suffering from it may be totally unconscious, subtle in its advent and protean in its manifestations. With other physical changes, any tissue of the eye may be affected. Through the vascular system persistent inflammations that occur notwithstanding treatment should always suggest the possibility of syphilis being their background. The fact that iritis may block the pupil and destroy the sight, though a frequent accompaniment of rheumatism, may not excuse overlooking the possibility of there being an underlying syphilitic basis.

A Rumanian authority has found that one-third of the eye syphilitic cases in clinics result in blindness. It is of great importance to industrialists to realize that the presence of syphilis may increase the severity of accidents and injuries to the eyes. Little cuts and bruises of the cornea that would otherwise pass unnoticed, may become extensive ulcers with iritic involvements and a consequent lowering of the sight to a point of economic blindness, which carries with it the full indemnity for complete loss of sight. The courts have held that the existence of syphilis does not lessen the responsibility of the insurance carrier unless it can be definitely shown that the loss of sight would have progressed even if the injury had not occurred.

A very fortunate condition of syphilis, however, particularly that involving the nervous structures, is that its earliest manifestations are often shown in the eyes and may be readily seen, and that the recognition of some of these prodromal symptoms does not require the skill of an expert or a specialist. The changes in the pupillary reactions to which reference has been made, can be readily

seen by any careful observer and while they are not in themselves satisfactory evidence of the existence of syphilis, for these changes may have been produced from other causes, they should at once indicate the necessity of having a blood test made. If the reaction is positive, this will certify as to the existence of the disease, although syphilis may be present even when the Wassermann is negative.

Another fortunate circumstance connected with the disease is its complete curability if the treatment is undertaken at a sufficiently early period, and also the stopping of the progress of the disease even if damage has already occurred to tissues that may be beyond repair.

How extensive syphilis is in industry may be gathered from a very few statistics. Unfortunately they are limited because no systematic effort has been made to have the blood examined as it should be in the case of everyone engaged in any activity whatsoever. In 36,000 employees of the DuPont de Nemours works in New York, New Jersey and Delaware, 4.2 per cent gave positive reactions. It is startling to learn that 10 per cent of 300 food handlers examined in New York were found to have syphilis, but a single treatment would render them noninfective. Of 2,372 American-born coal miners in West Virginia, 5.1 per cent, and of 778 foreign-born, 6.4 per cent, gave positive Wassermanns. In the negro sections of the South and in the tobacco and cotton regions where living conditions are the worst, and where crowded, filthy cabins and undernourishment are the rule, the United States public health survey showed that from 12 to 35 per cent of those engaged in industry or agriculture were syphilized.

There is a very close relation of syphilis to the slums, although it is found in a cross-section of every grade of society. But in the insanitary tenements where families are huddled in a single room, where cleanliness is almost unattainable, infection from one member of the family to another is almost impossible to avoid. The statistician of the health board of the city of Buffalo, speaking of the effect of insanitary quarters in the transmission of the disease, said that, given the amount of tuberculosis in any area of the city, he could estimate within 4 per cent the number of cases of syphilis that would be found in that same area!

The statistics as to the incidence of syphilis in industry are still exceedingly limited, and the proportion of those who have syphilis whose eyes will be affected has been even less fully determined. In a study made in New York City of 100,000 case records, the estimate is made that 10 per cent of the adult population will, upon examination, reveal evidence of syphilis, either active or latent; and Stokes estimates that 25 to 35 per cent of persons who have syphilis will show distinct lesions of the eye or its associated mechanism during the course of the disease.

One would think that a subject of such vital importance to industry would cause a general awakening as to its recognition and control. The inquiry was made of the medical director of one of the greatest railroad lines of this country as to the amount of eye syphilis the records of the road disclosed. He writes, "I am very sorry to inform you that we have no records of the invasion of the eye by syphilis. We hope as years go by that we may eventually have something worthwhile."

If at the time the visual tests were made of those employees, there had also been a blood examination, the proportion infected with syphilis could have been determined and the average length of life of such employees might have been increased by 10 years. The indemnities which the road had been obliged to pay, it may be safely estimated, would be reduced by 20 per cent. The savings would be greater by the preservation of these human machines than all the millions spent upon the mechanical equipment. There are enormous amounts of useless records which, when they are finally analyzed, will have written on the cards of those who needed the help that medical treatment could have given: "blind," "maimed," "paretic," or "dead," for the lack of the specific medication that they should have received. The time will come, of course, when a blood test will be as much a routine procedure as vaccination against smallpox is today, but meantime the price of this neglect is costly.

We take the most obvious things casually. Thirty years ago the National Society for the Prevention of Blindness inaugurated a campaign for the control of ophthalmia neonatorum. The combined efforts of the American Medical Association, the ophthalmological and obstetrical societies, and of the boards of health reduced

the blindness resulting from this cause in the United States to less than 7 per cent. The fact that it has increased to 9.1 per cent shows that eternal vigilance is the price we pay for the preservation of sight.

The little country of Portugal with warring armies on every border, has sent out a message of peace to the world. The Government has released a postage stamp in honor of the centenary of its School of Medicine, making known to the farthest corners of the earth a worthy institution of which few of us had ever heard, and thereby proclaiming that to save life is better than to take it.

This is a striking precedent and one worthy of emulation.

We must enlist the young business interests of the country—the Junior Chambers of Commerce, and through them the various social activities of both sexes.

The blindness resulting from syphilis cannot be diminished until the disease itself is conquered.

We have openly and frankly fought tuberculosis and despair has given place to hope.

So too must we meet syphilis.

The peril that walks in the darkness must be fought in the open.

A shock is needed to arouse a public that is uninformed and which is therefore indifferent and apathetic.

The Surgeon General of the United States Public Health Service has declared war on syphilis. It is an official pronouncement.

How better could a call to service be directly given, a call that would carry the message to Garcia and awaken the people everywhere than by the issuance of a postage stamp by our government bearing the insignia of Hygeia and on which should be inscribed a paraphrase of the old war cry of Cato: *Syphilis delendum est* (Syphilis must be destroyed).

Other governments might follow such a precedent. The postal service would then be used not only to honor our heroes and to celebrate our victories but it would become a potent agent in lifting one of the darkest shadows from our land.

Glaucoma

M. Carl Wilensky, M.D.

THE importance of early recognition and proper treatment of every type of glaucoma is emphasized by Dr. Wilensky, who also provided the very excellent illustrations accompanying the article.

GLAUCOMA is the name applied to several varieties of disease in which increased intraocular tension is the most characteristic sign. One per cent of all patients seen by eye physicians has glaucoma, the early recognition of which is of the greatest importance for the general practitioner, because here prompt and proper therapeutic interference may save everything, but a false diagnosis and improper treatment will result in loss of sight.

Types of Glaucoma

Glaucoma may be divided into three types: primary, secondary, and infantile glaucoma. Primary glaucoma is the type in which the increase in pressure occurs without our being able to discover any reason for it in an antecedent disease of the eye. Both primary and secondary glaucoma may be congestive, in which case the pressure rises suddenly to a considerable height and congestive symptoms are present; or they may be non-congestive, in which instance the increase in tension develops gradually, and congestive symptoms are absent.

The congestive variety is again divided into—(1) acute; (2) chronic; and (3) intermediate cases which are sometimes called subacute.

When the increase in tension is rapid, the congestive type results. When tension increases gradually, the eyeball accommodates itself to the altered conditions, and symptoms of congestion or inflammation are absent, then we have glaucoma simplex. Simple glaucoma may change to the acute or chronic congestive type.

Congestive glaucoma is divided into four stages: (1) prodromal stage; (2) stage of active glaucoma; (3) stage of absolute glaucoma; and (4) stage of degeneration.

In most cases the prodromal stage precedes the inflammatory attack, and is characterized first of all by attacks of obscuration of vision, an illusion of a cloud or smoke concealing objects from the patient. He sees rainbow-colored rings around lights. During the attack there is frequently a feeling of tension in the eye, or a dull frontal headache. If the physician examines the eye during such an attack, he finds the cornea a little dull and diffusely clouded, like glass that has been breathed upon. The anterior chamber is somewhat shallow through advancement of the iris; the pupil is more dilated than usual and reacts sluggishly; the tension of the eye is distinctly increased. Frequently, too, slight ciliary injection is present.

Such an attack lasts several hours, after which the eye returns to normal both in appearance and function. First these attacks occur at long intervals of months or weeks, but they become more frequent. Often an attack is brought on by a hearty meal, late hours, or emotional excitement. These attacks may be cut short by the patient's going to sleep.

During the prodromal stage the patient asks for frequent changes to stronger reading glasses as there is a rapid diminution of the power of accommodation.

The acute attack manifests itself by violent pain radiating from the eye along the first and second branches of the trifacial nerve; the patient may have pain in the head, ears, or teeth; sometimes there are nausea and vomiting; and there may also be fever. Such attacks have been diagnosed wrongly as "bilious attacks."

Visual power falls rapidly away. The field of vision is considerably narrowed, mostly on the nasal side. Objective examination shows edema of lids and conjunctiva. The injection is venous in character and dusky-red in color. The cornea is cloudy and is almost insensitive to touch. The anterior chamber is shallow, the iris discolored, the pupil dilated. From the pupil we get a grayish-green reflex. Tension of the eye is considerably elevated. After some days or weeks improvement sets in; however, the vision never again is as good as it was before the attack occurred.

After the attack subsides, the condition of the eye remains quiescent for quite a long time, and the patient becomes hopeful of a permanent cure. Then a new attack sets in.

The disease then enters the third stage—absolute glaucoma, in which the eye has become completely blind. The pupil remains dilated, oval, sluggish; the iris is discolored, the anterior chamber is shallow, tension is increased, and the eye is more or less injected.

Later on degenerative changes make their appearance in the blinded eye, which we call glaucomatous degeneration. After the eye has been bad for years, it at length becomes softer, smaller, and atrophic. In other cases serpiginous ulcer may develop, with perforation and consecutive iridocyclitis or even panophthalmitis. Not until the glaucomatous eye has become shriveled does it allow its unfortunate possessor to have any lasting rest. *Glaucoma fulminans* is a rare form in which violent symptoms of inflammation develop suddenly and in which blindness may result in a matter of hours.

In glaucoma simplex, or non-congestive glaucoma, the increase in tension sets in gradually so that no inflammatory symptoms are produced. It may be necessary to examine the eye several times before an increase in tension is found. We have to depend for diagnosis on a history of gradual diminution of sight and the finding of a glaucomatous cup in ophthalmoscopic examination, or the characteristic contraction of the visual field. It is important to distinguish the glaucomatous from a large physiologic cup and from the cup formed by atrophy of the optic nerve.

In secondary glaucoma the increase in pressure is the result of some other disease or injury of the eye. Some of the conditions which may bring about glaucoma are: (1) swelling of the lens during the formation of cataracts; (2) dislocation of, or injury to, the lens; (3) following needling of the lens, discission of secondary cataract, or cataract extraction; (4) ulcers or wounds of the cornea with prolapse of iris; (5) total adhesion of the iris to the capsule of the lens; (6) iridocyclitis, uveitis, choroiditis; (7) intraocular tumors or foreign bodies in the eye; (8) hemorrhages into the retina, vitreous, or aqueous; (9) thrombosis of the central vein.

Hydrophthalmos, or infantile glaucoma, is that type in which the canal of Schlemm is absent.

Diagnosis of Glaucoma

Cases of inflammatory glaucoma are sometimes confused with iritis or iridocyclitis and are therefore treated with atropine, which aggravates the condition seriously and may result in blindness.

Eyes with glaucoma simplex, which present no external symptoms of inflammation but in which the dilated pupillary space transmits a greenish reflex, are sometimes erroneously thought to have beginning cataracts, and the unfortunate patients are put off in expectation of the cataract's becoming "ripe." In the meantime precious sight is irrevocably lost. I have seen these most tragic patients, after they have become totally and permanently blinded by the ravages of glaucoma, present themselves with the false hope that sight would be restored by a cataract extraction. The following history is an example of such a case in which, fortunately, although there was much delay, the patient was finally advised to see an oculist.

A colored woman, aged 33, began to have dim vision and noticed blue rings around lights about September, 1936. In November she went to a doctor and was told that she was developing cataracts and that there was nothing to do for it; that she should return in two years when the cataracts would "cover the sight" and then would be the time to remove them. She was advised to get a pair of glasses. In December, 1936, she procured a pair from an optician. She never could see well with them and after she had returned to him several times, the optician fortunately advised her to see an oculist. Upon examination I found her tension (Schiötz) 55 mm. in the right eye and 40 mm. in the left. The right nerve head showed glaucomatous excavation. Her left eye showed numerous posterior synechiae. The details of the fundus could not be made out because of opacities in the left lens capsule. Her vision was only 20/200 in each eye. Both of her eyes have already been operated upon, the tension has been reduced to normal in both eyes, and vision has improved slightly in her right eye to 20/100 and in her left eye to 20/50. If this patient had continued to wait until her cataracts were "ripe," we know what tragic consequences would have resulted.

Diagnosis of glaucoma should be based on: (1) the patient's history of the case, and (2) the signs and symptoms.

In the prodromal stage the diagnosis may be obscure because the physician sees the patient during an interval between the attacks,

Physiologic Excavation

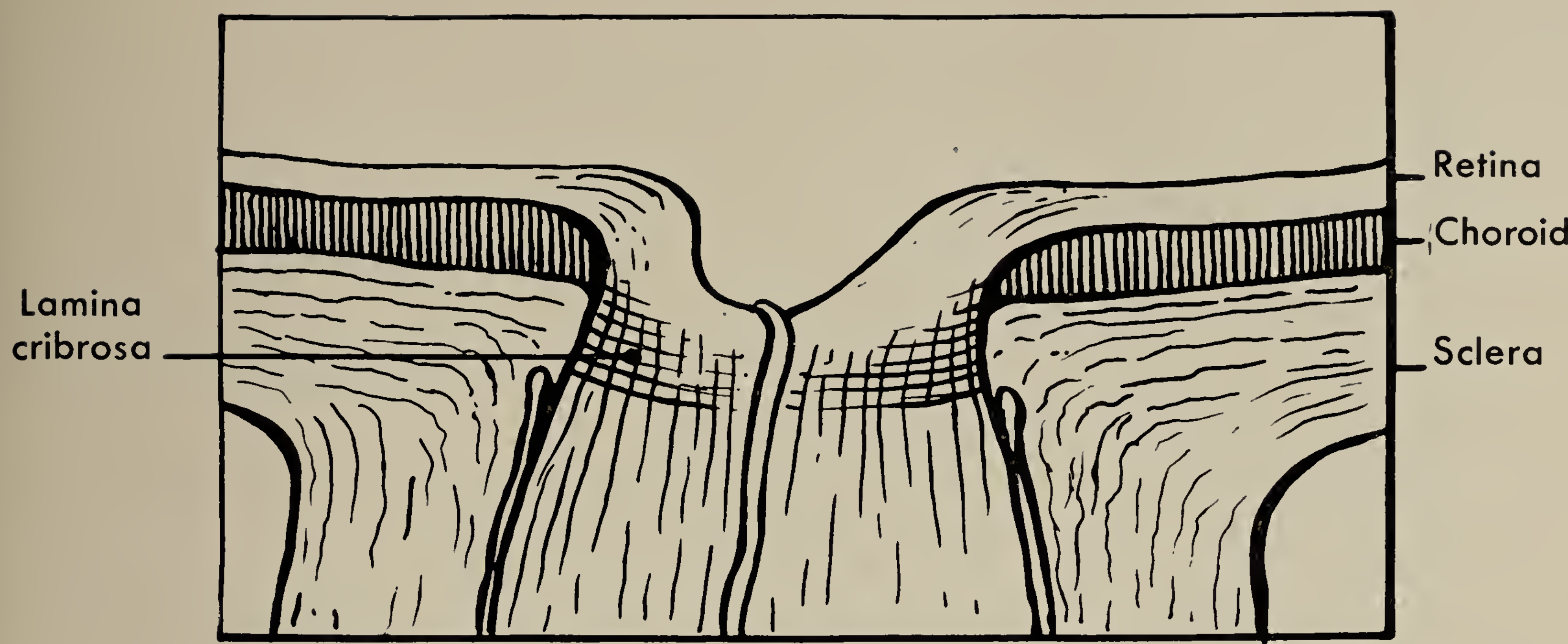

Figure 1.—The physiologic excavation is always partial. It never takes up the entire nerve head.

Atrophic Excavation

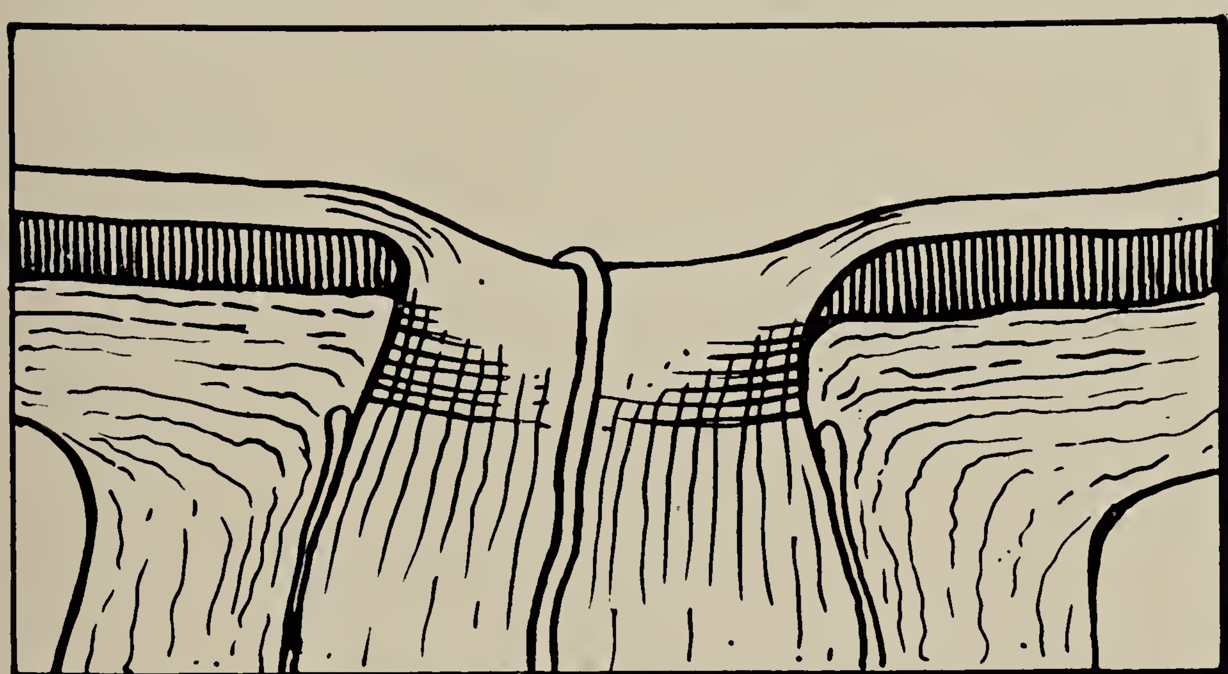

Figure 2.—The atrophic excavation is caused by the atrophy of the nerve fibers that form the nerve head. It extends over the entire nerve head, but always remains shallow.

Glaucomatous Excavation

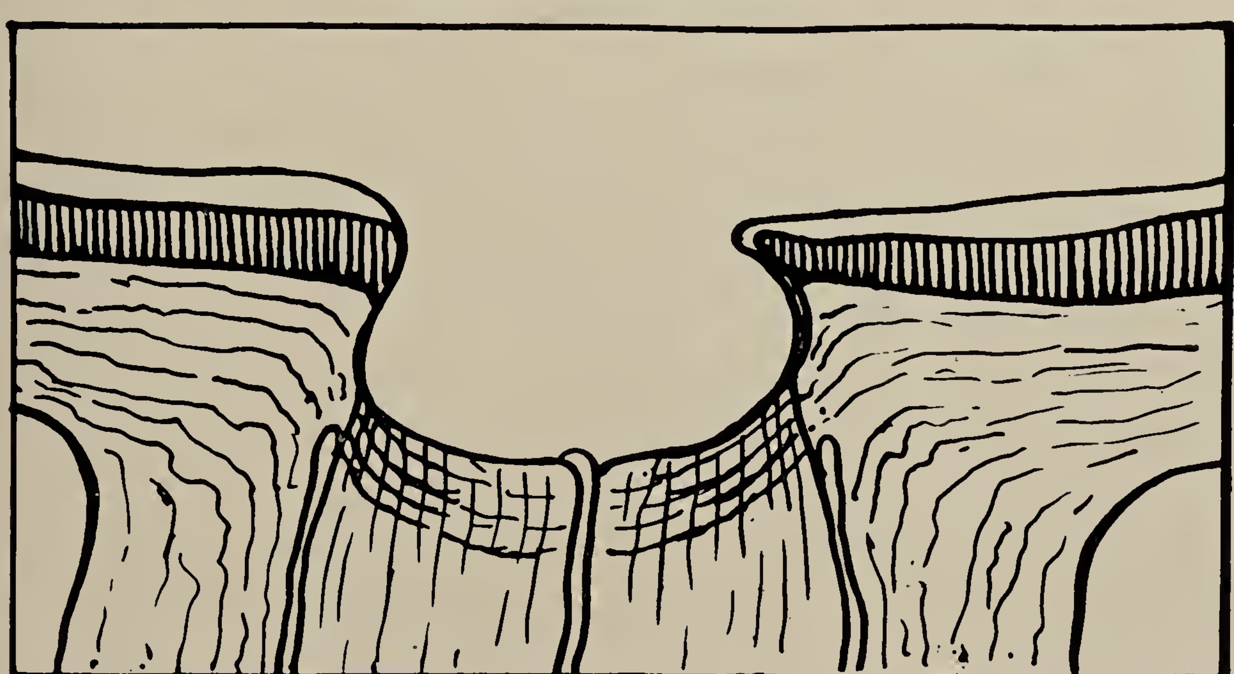

Figure 3.—The glaucomatous excavation comprises the entire nerve head. The retinal vessels are seen to dip or bend sharply at the disc margin. When the glaucoma has been present a long time, the nerve is surrounded by a light ring, due to an atrophy of the choroid.

when the eye looks normal. However, if an elderly patient has had several changes of glasses recently, the physician must be on guard for glaucoma, especially if there has been discomfort or pain in or around the eye, or if the patient has seen colored rings around lights and has had periods of dim vision.

The following is a listing of common signs and symptoms which may have significance in the diagnosis of glaucoma:

1. Congestion—this is dependent upon the type of glaucoma. In glaucoma simplex there is no congestion and so, unfortunately, the condition is sometimes overlooked.
2. Pain may be so severe as to cause loss of appetite, loss of sleep, and vomiting. Fever may even set in.
3. Intraocular tension—this is increased, except in the prodromal stage or in glaucoma simplex, when it may be found normal at times. Tension is taken with a tonometer that is placed on the eyeball after a drop of anesthetic has been instilled into the eye.
4. Reduction of vision.
5. Changes in visual field are typical. In early stages there may be a comet-like scotoma going up or down from the blind spot (Seidel's sign). Later Bjerrum's sign and Rönne's step may appear. The visual field becomes constricted, first on the nasal side.
6. Glaucomatous cup may be found upon ophthalmoscopic examination. In the congestive type the fundus may not be clearly seen.
7. Anterior chamber is shallow.
8. Iris is discolored. The pupil is dilated, has a greenish reflex, and reacts sluggishly, if at all.
9. Cornea may look steamy—like a glass that has been breathed upon.

Importance of Proper Treatment

Unless properly treated, glaucoma goes on steadily to blindness. When an operation is performed early, in the acute congestive type, the results are often favorable. The pain ceases; the cornea becomes clear and sensitive once more. Other inflammatory symptoms likewise speedily disappear. The sight, which during the attack was very much reduced through cloudiness of the cornea and the compression of the retinal vessels (nerve fibers), now increases considerably. Prognosis depends on the type of glaucoma and also on the amount of degenerative change that has

taken place when the patient applies for treatment. Operation will not restore sight lost because of excavation and atrophy of the papilla of the optic nerve. Prognosis is best in those cases that respond readily when treated with miotics. Patients who appear late—and unfortunately this happens entirely too often—have lost so much visual function and the resistance of the eye is so lowered by the disease that the prognosis is poor. However, even these far-advanced cases should not be neglected. This was most vividly brought to my attention this afternoon (November 10, 1937):

> A. B., a well-developed young Negro, came into the clinic by himself. When he made his first visit to the clinic on July 7, 1936, he had to be led. He gave a history of failing vision since 1930, when he also noticed rainbows around lights. In 1933 he began to have deep aching pain that seemed to be behind both eyes. On his first visit, vision in the right eye was only light perception and in the left eye was hand motion. Now he can count fingers at three feet.

While this patient may not seem to have much vision, it is the difference between being independent and having the ability to walk to the clinic, and having to be led. It is difficult to understand why some persons will neglect their eyes until they are practically blind before seeking medical attention.

Of course, there are cases in which, in spite of all attempts at treatment, complete blindness results.

Anatomy of the Eye

All the symptoms of glaucoma can be explained by congestion and increase in intraocular pressure. But the cause of this increase in tension cannot be positively determined in every case. Of the many theories which have been propounded, no single one is satisfactory in every respect.

The most generally accepted theory, that of Knies and Weber, presupposes a disturbance in the outflow of the aqueous.

To appreciate this better we might stop here and review the anatomy of the eyeball in order to get a better understanding of the factors involved. The aqueous chamber is bounded in front by the cornea, behind by the lens and its suspensory ligament, and laterally by the *ligamentum pectinatum* and anterior portion of the ciliary body.

The iris divides the aqueous cavity into an anterior and a posterior chamber. The posterior communicates with the anterior chamber by means of the pupil.

The portion of the anterior chamber at which the sclerocorneal margin, iris and *ligamentum pectinatum* meet is known as the angle or sinus of the anterior chamber, or iris angle. This region is of great importance; upon its integrity depends the proper circulation of the lymph.

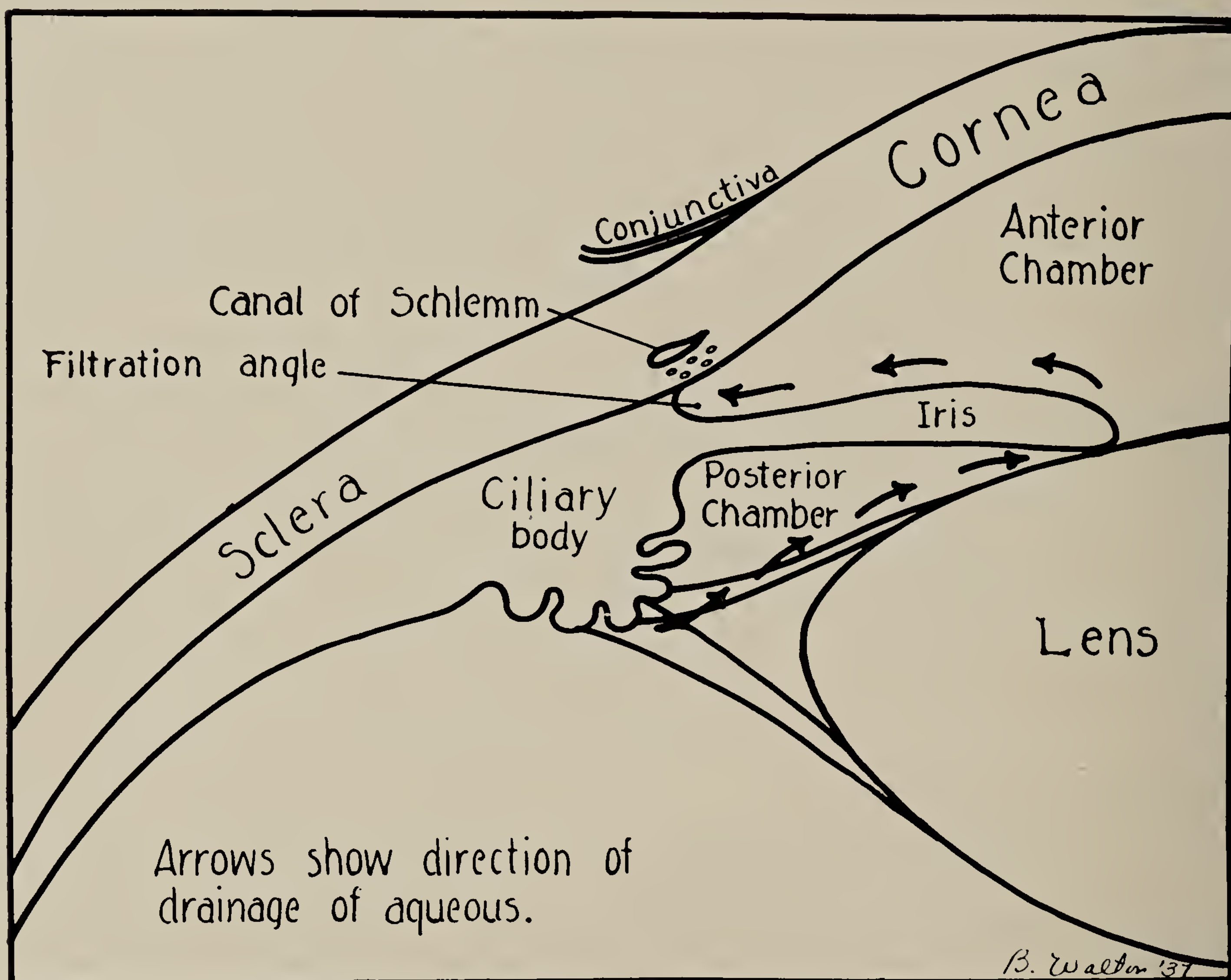

Figure 4.—Angle of the anterior chamber in the normal eye.

The *ligamentum pectinatum* is formed by the breaking up of Descemet's membrane at the margin of the cornea into bundles which connect the sclera with the root of the iris. Thus the spaces of Fontana are formed. To their outer side, at the sclerocorneal junction, is Schlemm's canal, a network of veins.

The aqueous is secreted by the ciliary processes. It first passes into the posterior chamber, then through the pupil into the ante-

rior chamber, and leaves the eye through the spaces of Fontana and Schlemm's canal, passing into the anterior ciliary veins. A portion passes into the lymph spaces of the iris, and thence to the lymph spaces above the choroid.

Predisposition to Glaucoma

Genuine glaucoma develops only in an eye which has a predisposition to it. This predisposition depends upon the following

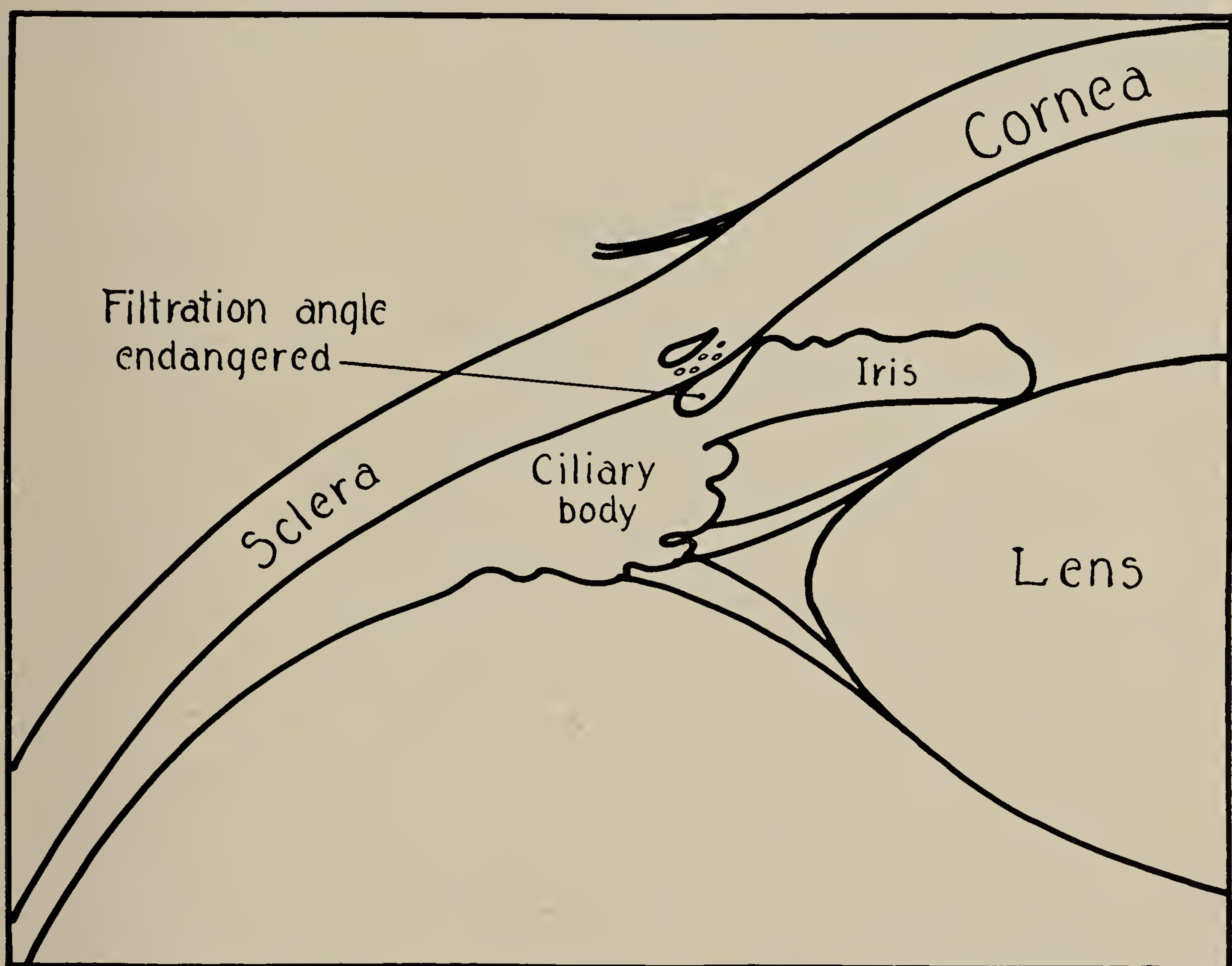

Figure 5.—Angle of the anterior chamber in hypermetropic eye with dilated pupil.

insufficient spatial relations: (1) smallness of the eye as a whole; (2) shallowness of the anterior chamber; (3) undue protrusion of the ciliary processes; (4) disproportionate size of the lens. These relations are found in the hyperopic eye when it becomes old. The hyperopic eye is smaller than the normal eye, its anterior chamber is shallower, and its ciliary processes protrude more than usual toward the lens, because the ciliary muscle is hypertrophied by the

constantly maintained accommodation. The lens in such an eye increases in size with advancing age and ultimately becomes too large, or the space between the lens and the ciliary processes—the circumlental space—becomes too narrow for the lymph to flow through from the vitreous cavity to the aqueous. The lymph becomes dammed up in the vitreous, which therefore increases in volume and pushes the lens and iris forward, thus narrowing the anterior chamber still further.

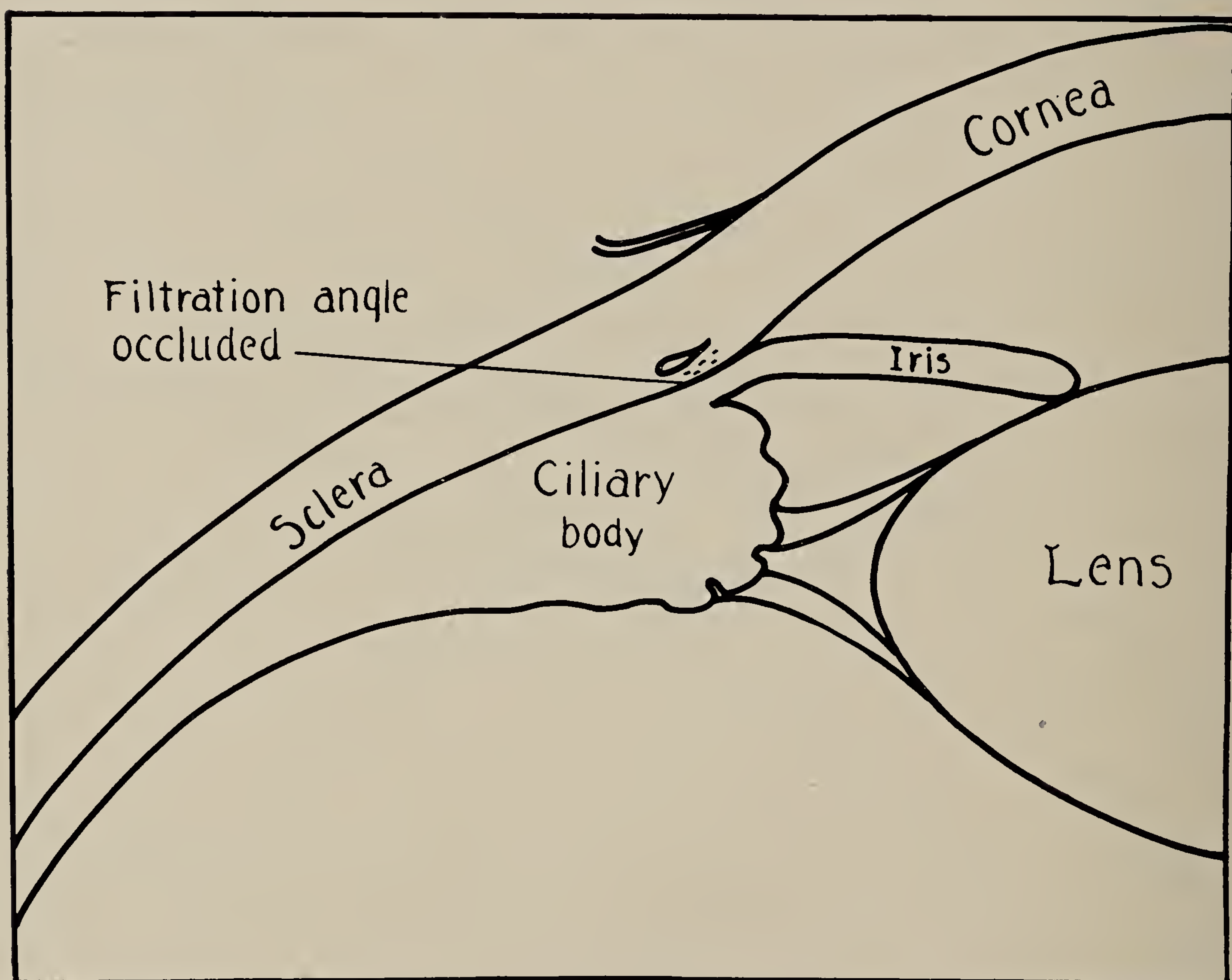

Figure 6.—Angle of the anterior chamber in acute congestive glaucoma.

An acute attack of glaucoma does not occur in the predisposed eye until the outflow is blocked by closure of the sinus of the chamber. This condition may be brought about either by dilatation of the pupil, which causes the iris to become short and thick, thereby blocking the narrow sinus of the anterior chamber, or by disturbance in the circulation of the blood, causing venous congestion, which may be brought on by worry, emotional disturbance,

insomnia, bronchitis, overeating, indigestion, cardiac disease, syphilis, gout, influenza, neuralgia of the fifth nerve, or an error of refraction. An individual who is overusing and straining his ametropic or improperly corrected eye causes a congestion of the ciliary processes which are extremely rich in veins. The ciliary processes consequently swell up. This results in a narrowing of the space around the lens. Communication between the vitreous cavity

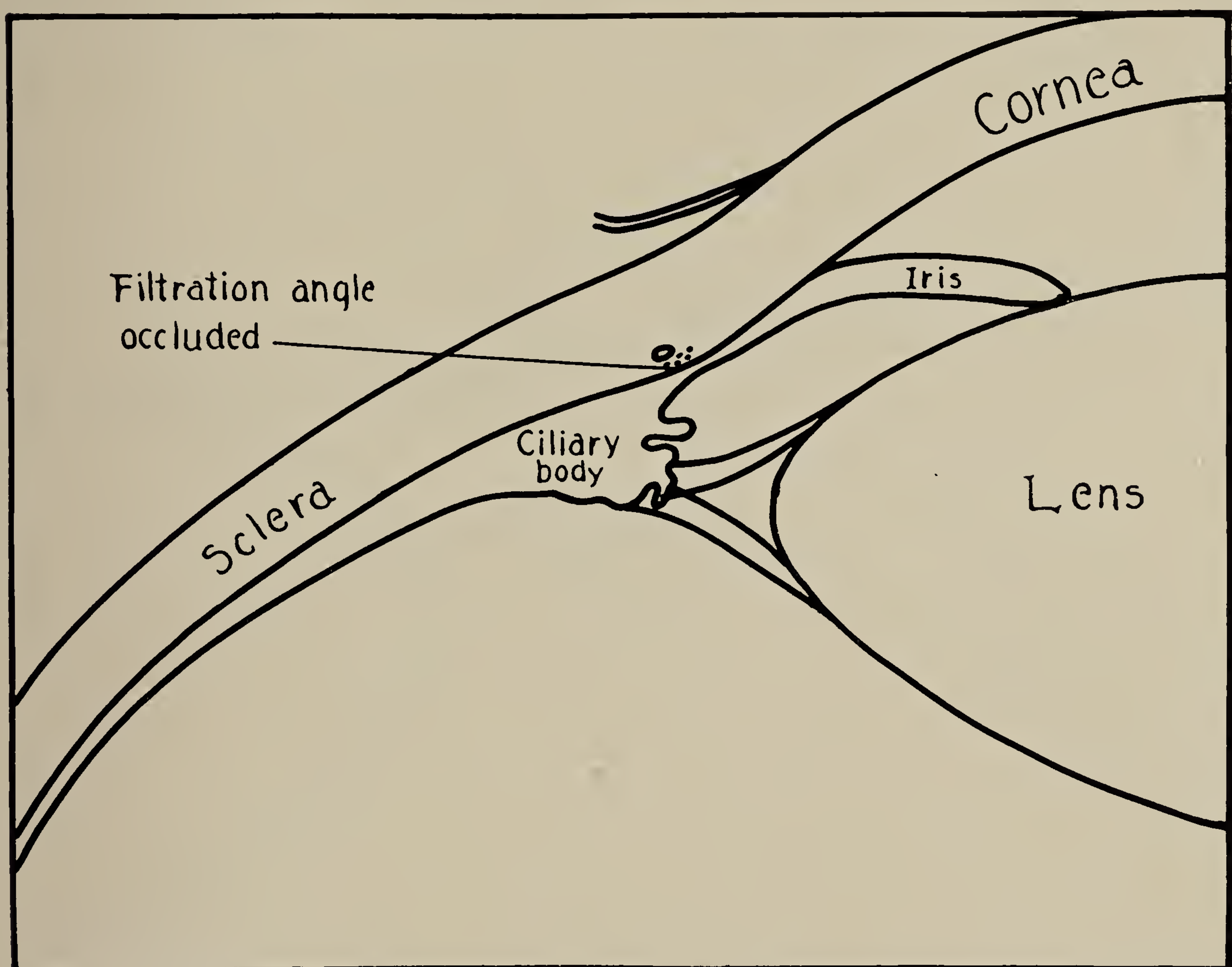

Figure 7.—Angle of the anterior chamber in chronic glaucoma.

and the anterior chamber is interfered with. The vitreous, because of retention of lymph, swells up and pushes forward upon the ciliary processes which can give way only toward the front. Consequently the root of the iris is jammed against the corneosclera. This blocking of the outflow of the aqueous through the spaces of Fontana and Schlemm's canal results in an increase of intraocular tension.

Another factor involved in this strain upon accommodation works as follows: in the eye of the young during accommodation

for the near point, the diameter of the lens is reduced to about the same extent as that of the contracting ciliary muscle. The space around the lens remains about as wide as it was before, and the zonula remains tense as before. But the conditions are quite different in advanced life; when the elasticity of the lens is lost, the ciliary muscle contracts, but the form and size of the lens

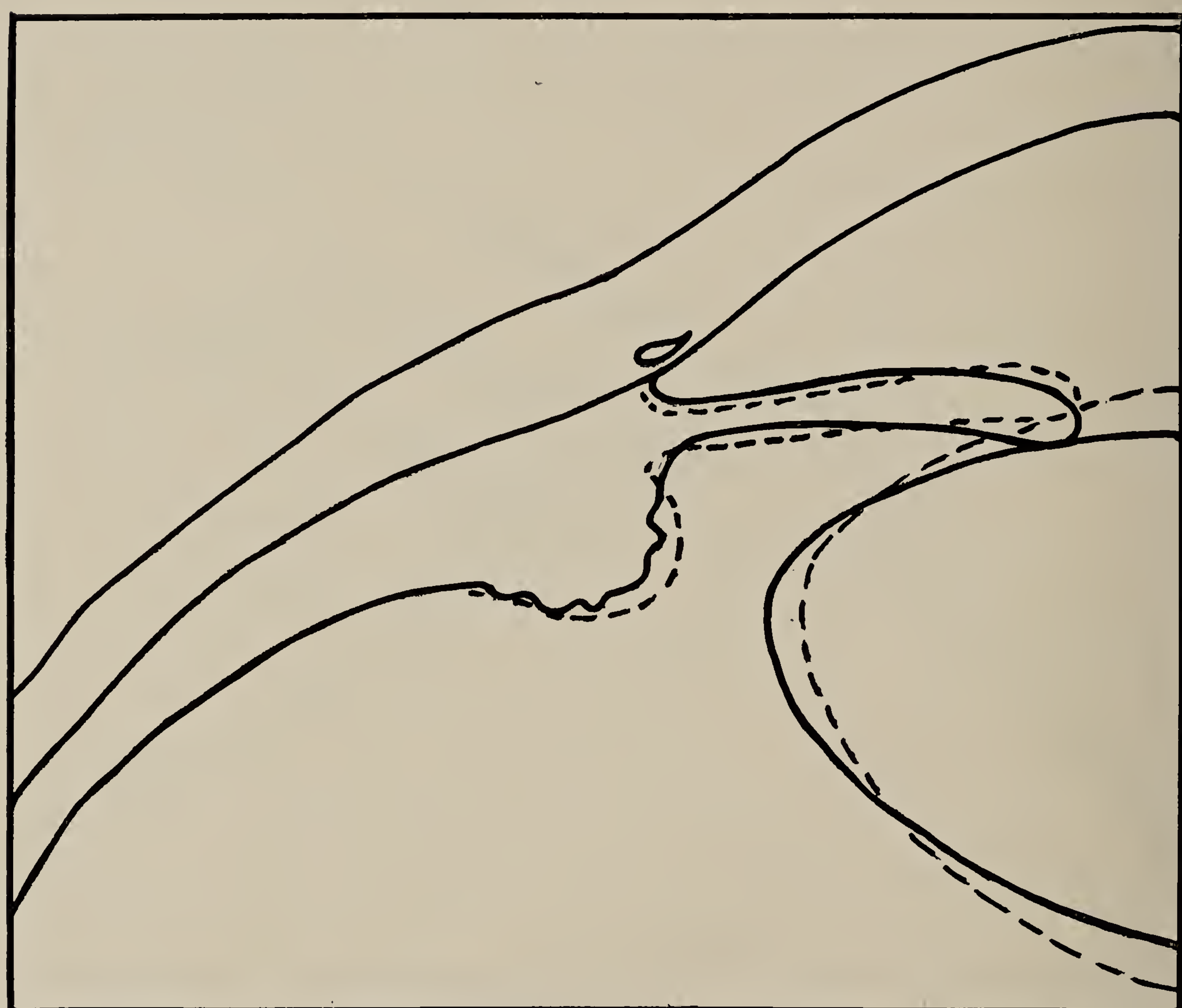

Figure 8.—Schematic representation of the process of accommodation. The relation of the parts when the accommodation is at rest is shown by the black lines. The dash lines show the relation during accommodation.

remain unchanged. The ciliary processes are thereby pressed against the lens and the zonula is slackened. Hence the necessity of correcting refractive errors as a preventive measure.

During the development of cataracts the lens may swell and precipitate an attack of glaucoma. Therefore, individuals with developing cataracts should be under the observation of an oculist.

Primary glaucoma is always bilateral, but as a rule the disease does not affect both eyes simultaneously. Most cases occur after the fortieth year. Not one per cent, according to Priestley Smith, begins earlier than the twentieth year. There may be an hereditary tendency to glaucoma.

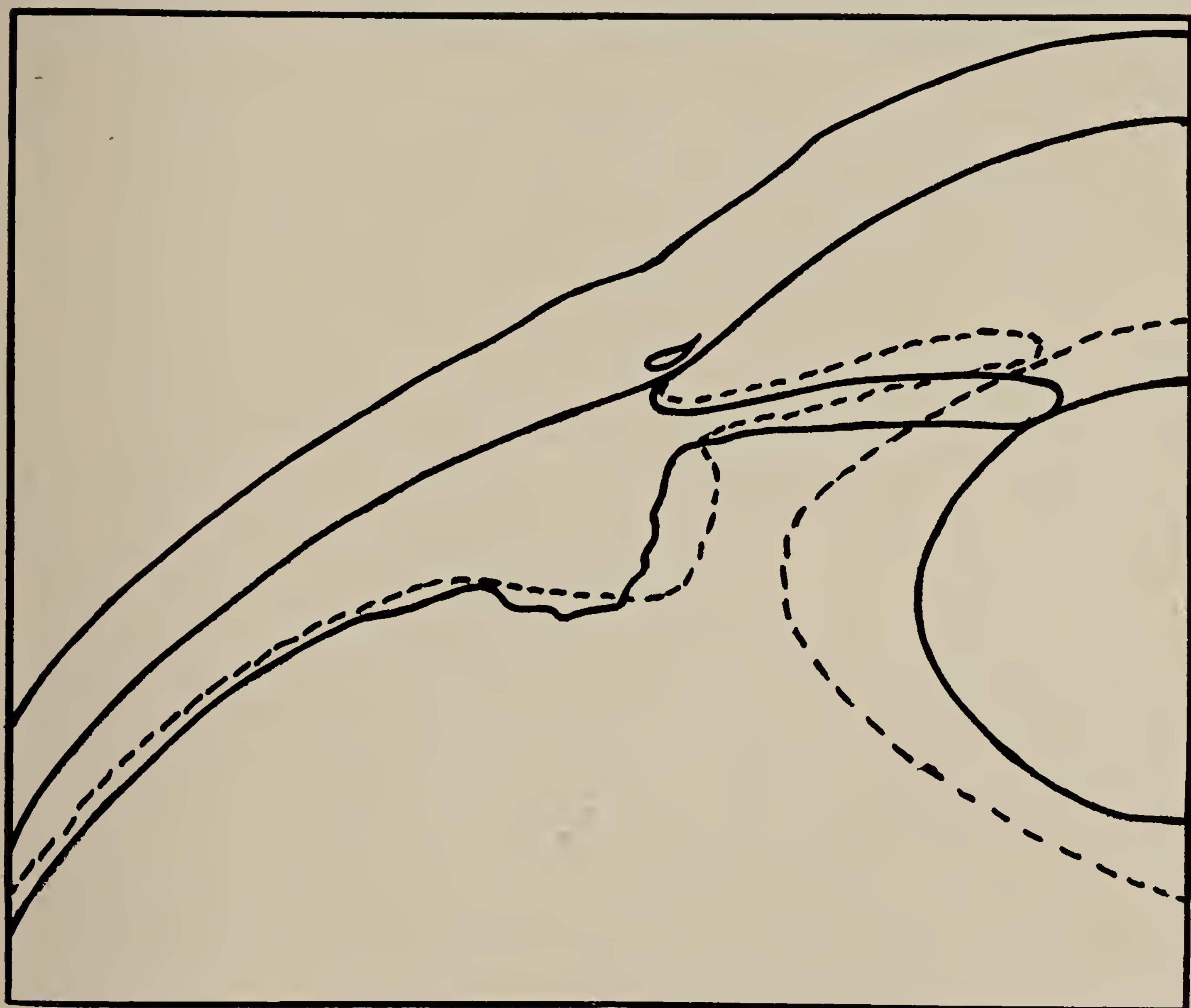

Figure 9.—Schematic representation of the predisposition to glaucoma. The black lines show the spatial relations in the young, emmetropic eye; the dash lines, the relations in the senile, hypermetropic eye.

Summary

Before one can diagnose glaucoma, one must first *think* glaucoma. Since glaucoma is the disease of the eye most frequently ending in permanent blindness, it is imperative that this condition be kept in mind. Whenever a patient presents himself with a history or any signs and symptoms suggestive of glaucoma, this lead should be thoroughly investigated until a diagnosis of glaucoma is made or

ruled out. Many tragic case histories illustrate what happens when patients are fitted with glasses several times and no suggestion is ever made that there may be some disease condition of the eyes causing the poor vision. When the physician finally sees such patients, they are, entirely too often, practically blind. Early diagnosis is essential and proper treatment must be instituted before sight has been permanently damaged.

Development of Sight-Saving Class Work in the Fairhill School, Philadelphia

M. Reba Sprowles

THIS article indicates how a home economics course and courses in salesmanship, social studies, and gardening, as well as a home-making and personal hygiene course, were incorporated in the work of the sight-saving classes at the Fairhill School, Philadelphia.

UNTIL 1935 the work in the Fairhill School was similar to that which would be found in any school having sight-saving classes. As the number of partially seeing children assigned to the school increased, it was found that many of them had somewhat below the normal I.Q. No classes had been formed for children having the double handicap of subnormal mentality and serious eye condition and the classes established for orthogenic backward children were full. Moreover it was thought that in these particular cases the eye defect was more serious than the slightly subnormal mentality; hence placement in sight-saving classes seemed unavoidable.

At this time the Fairhill School had six sight-saving classes with approximately 100 children. Another group was then added, bringing the total number of children to 110, far too many to be cared for in regulation sight-saving classes by the seven teachers available. After consulting with Dr. Edwin Adams, Associate Superintendent in charge of special class work in Philadelphia, we decided on a logical change in the organization of the work. All of the sight-saving class children in grades one through six were placed in three groups, comprising, respectively, grades one and two, grades three and four, and grades five and six. Those beyond the sixth year who were certified by the medical and psychological departments as capable of doing high school work were placed in a class to prepare them for this, in charge of an unusually competent

teacher who, in her long experience, has had the satisfaction of seeing many sight-saving class girls and boys finish high school with credit, some of them with honor.

It was arranged that the three remaining teachers take charge of those pupils beyond the sixth year who, mentally and physically, could not be certified for high school work. These range in age from 13 to 20 years. They are divided into three groups, the chief criteria for classification being chronological age and social homogeneity. These three classes rotate, all pupils, both girls and boys, having the benefit, every day, of the work offered by all three teachers.

Home Economics Course

The first course is home economics, consisting of: (1) Helping to prepare lunches for sight-saving class children and teachers; (2) canning and preserving; (3) instruction in marketing—kinds of foods to buy and actual experience in marketing; (4) setting and serving a table; and (5) special cooking asked for by the children, making of candies, cakes, and other desirable foods which are seldom made in the homes of most of our children.

The work of preparing a good, wholesome meal to be served to the children for ten cents was made possible by the assistance given by the Shallcross Parental School. Because of a bumper crop of vegetables raised by the Shallcross School children, which could not be sold because of lack of taxation on school property, we were given the opportunity of securing large consignments of vegetables several times a week. As a result, not only were we able to give the children better meals, but the materials were at hand for wholesale canning. Children in both the regular and the sight-saving classes were asked to bring in jars, and hundreds of quarts of tomatoes, beans, carrots, catsup, tomato juice, relishes and conserves were prepared by the children and used for the lunches during the following winter.

The contributions from the Shallcross School led to another activity. When Hallowe'en and Christmas came around, our children learned that they could add to the happiness of others, and great enthusiasm arose over the preparation of cakes, candies, and calendars for each boy at Shallcross. According to the report of Mr.

André, superintendent at Shallcross, and of Dr. Adams, under whose supervision Shallcross also comes, these boxes were surely well received. We do know that our children had far more of the true Christmas spirit than they had ever realized before.

The teaching of English and arithmetic centers around the activities of each group. The accounts of all incoming and outgoing moneys were kept by the children, and without realizing it children previously uninterested in any arithmetic not only were able to calculate expenditures and accurate change, but actually did practical bookkeeping. English improved perceptibly, although we had many embarrassing moments, as when Elizabeth, our head waitress, thrust her head in at the doorway of the visitors' dining room and demanded, "Do any of youse want more coffee?" It was just such occasions that afforded the motive for teaching the proper way of serving a table, and of improving English.

The following is a concise synopsis of the course drawn up by the teacher herself:

Aims.—The aims of this course are: (1) to develop a degree of skill in food selection, preparation, and service; (2) to instil habits of cleanliness in handling and preparation of foods, and to develop sanitary kitchen practices; (3) to direct pupils' attention to the relation of foods to health; (4) to prepare the pupils to share in the work in the home.

During the fall and winter term the class takes up: budgeting; menu making; selecting and purchasing foods; planning and preparing lunches for pupils, teachers, and guests; washing dishes and cleaning up the cooking room; making a study of food combinations and costs; and balancing the account.

Home Preserved Foods.—The first project of the fall and winter term is that of home preserved foods. The methods of preserving include canning, preserving, salting, drying, refrigeration, and pickling. Tomatoes, beets, corn, string-beans, and carrots are canned either by the cold pack or open kettle method.

The preserving consists of the preparation of grape jelly and apple sauce. India relish, catsup, chili sauce, and tomato juice are the relishes made by the classes.

Meats.—The preparation of meats is the second project. A consideration is given to the sources and kinds of meats; method

of cooking; food values; and care of meat in the home. The classes learn the preparation of pot roast, beef stew, roast lamb, meat loaf, ham, and chicken.

Fresh Vegetables.—The value of fresh vegetables and their preparation are the subjects of the third project. The practical work consists in the pupils' learning how to cook parsley and potatoes, spinach, creamed onions, glazed carrots, and vegetable platters.

Salads.—The fourth project consists of discussing the importance, selection, and cost of salads; and the following kinds of salad are prepared by the class: apple and celery salad, fruit salad, Raggedy Ann salad, cole slaw, pear salad, egg and tomato salad, and Waldorf salad.

Home-made Candy.—The next project takes up the subject of candy, considering the place of candy in the diet, its use and abuse, and the cost of candy. During this project the children make chocolate, vanilla, pistachio, mint, and walnut fudge. They also prepare stuffed fruits, and learn about the packing and wrapping of candy.

Hot Breads.—The first project of the spring term is the subject of hot breads. Both baking powder breads and yeast breads are included.

Desserts.—The place of desserts in menu making and the relation of dessert to the remainder of the meal are next considered. Here instruction is given in the preparation of custards, pastry, tarts, fruits, and puddings. The following cakes are made as part of the practical work: sponge cake, upside-down cake, strawberry shortcake, layer cake, cup cake, cottage pudding, cream puffs, molasses cookies, almond cookies, ginger snaps, and sponge dainties. Practice in fancy icings is included.

Informal Entertaining.—The practical work in connection with informal entertaining consists of making a great variety of sandwiches, both rolled and plain, fruit juice cocktail, fancy iced cakes, and candy.

Salesmanship, Social Studies, and Gardening

In the second activity of our experiment salesmanship and social studies are taught.

Salesmanship gives opportunity for much oral English, methods of approaching the customer, the customer's attitude toward the

salesman, the salesman's arguments for his article, etc. One of our boys secured a job for the summer selling Top Icer Refrigerators. The course also resulted in a noticeable improvement in both the appearance and manners of our children. The social studies give opportunity for a number of activities, the last one being the construction of a coal mine, showing the various levels of the mine, with tracks and cars, the elevator which worked, the breaker, screens, etc. The coming term we plan to include simple home mechanics as part of the teacher's work.

Course in Salesmanship.—Following are the topics that are included in the course in salesmanship: aims; place of salesman in business; types of positions available; types of sales positions; salesman's qualifications; how to find a job; letter of application; answer to advertisement; how to write "Situation Wanted" advertisement; how to write "Help Wanted" advertisement; synopsis of an interview; possible questions in an interview; interview score card; five buying motives; factors determining selling field; types of stores; questions for special report; and kinds of merchandise.

The Course in Gardening.—The sight-saving class garden is one of our great adventures. Since the school had no available ground, obtaining it became the first problem. The use of ground at Shallcross School was considered, but the idea was abandoned because of the transportation problem. Finally a good plot, 40 feet by 120 feet, was found a short distance from the school. It belongs to the public library and was secured without much trouble. It had been used as a ball field by the neighborhood boys, and was hard, packed clay. After our boys had raised a goodly crop of blisters trying to dig it up, we finally secured the use of a plough from Shallcross. Horses had to be provided, and these we begged from the city street-cleaning department. Grass seed and fertilizer were procured from various agencies, and some we bought. Topsoil was the next problem—some was begged after a heart-breaking experience of paying thirty dollars a ton for very questionable topsoil, and finding that a ton equals one cubic yard of soil and spreads over a very little surface.

Next came the question of suitable plants, and we gladly acknowledge contributions from Michell's, Burpee's, Mr. Ellis Gimbel, and

many other sources. The firemen next door were invaluable in many ways. Men from the filtration plant across the lot dug up plants from their own gardens, and with great hesitancy asked if they could be of use; neighbors from blocks around brought in other contributions; and the children from both the sight-saving classes and the regular classes contributed constantly. Acknowledgment should also be made to many of the members of the faculty, most of whom, day after day, carried heavy contributions from various distances. The children formed their own committees and came long distances through the heat and drought of last summer to take care of the garden. As a result, last September and October every class was supplied with cut flowers many times. Bunches of flowers were taken to the firehouse, the filtration plant, and to the library. We doubt if these children had ever experienced keener satisfaction.

This year the garden was begun early in March. The work has progressed far beyond our fondest expectations. In this, our second year in gardening, we dug paths; put in flower borders; planted trees; put in some flagstones; made a rock garden; put in a barberry and privet hedge around the whole garden; made several special flower beds; had hundreds of tulips, daffodils and irises blooming; transplanted several peach trees; made and put in a rose arbor with a weathervane on top; put in a bird bath, sundial and concrete bench, all of which had to be fastened down with cement to insure against theft; planted ivy, lilies of the valley, and other low plants around each. Altogether we have quite a presentable garden. When September comes again we are expecting to be able to furnish even more flowers than we did last year. This year one end of the garden was used to raise a few vegetables. Those not eaten raw were used in the school kitchen. The chief object of the vegetable garden was to let the city children see how vegetables grow.

Before leaving the school for the garden each child has a written assignment of work handed to him, so that there is no haphazard work and no time is lost.

That the children love the garden work is evidenced by their early arrival, giving up lunch periods to finish assignments, and visiting the garden after school dismissal.

The English and arithmetic in these activities center around the garden work. When the bird bath was presented as a complete surprise by one of the regular classes, a volunteer was requested to reply to the presentation speech. One girl asked for the privilege, and, in sincere and graceful sentences, accepted the gift and expressed the appreciation of the sight-saving classes. One of the sight-saving class teachers murmured to me, "And they say this has no educational value."

Our garden was started purely as avocational, but some well worth-while vocational results are developing.

Through the influence of one of our attendance officers and of some of the Juvenile Court authorities we have placed three boys on farms. Herbert, the first boy placed, a boy about nineteen years old, was keenly impressed with his obligation to make good because of its influence in getting jobs for other boys. His work was more than satisfactory to his employer. He is working on a dairy farm. His employer is keeping part of his wages for him, promising that in a few years he will be able to make a down payment on a farm of his own, and offering to help him buy and start the place.

Home Making and Personal Hygiene

The third activity in our experiment is in many ways the most interesting. Here, again, we are fortunate in having an unusually talented and enthusiastic teacher willing to spend herself to the utmost for the benefit of the handicapped children.

Home Making.—The first term was devoted to teaching the care of the home and the care of the baby. Since we believe that the greater part of the lives of these children will be spent in the home, and since babies are far from a rarity in most of these homes, the practicability of the course could not be questioned.

A large doll was donated by a friend of the teacher. The first lesson consisted of teaching the writing of congratulatory cards, sending gifts, etc. A display-worn bathinette and shopworn layette were obtained at little expense. The baby was given actual water baths, followed by olive oil treatments. Methods of dressing, carrying, and feeding the baby were all carefully taught—how to make its bed, place it in the bed, and cover it for protection against insects, how to launder its clothes, prepare its food—all received

attention. An improvised refrigerator that actually works was next attempted, and then a hand-made screen covered with baby pictures was made. If nothing else was accomplished, we should feel repaid by the attitude of respect and admiration for a well-appearing, clean child, which gradually developed among our children. It is a joy to see some of our older boys carefully carry the newly bathed and well-dressed baby to the office for official inspection of the clothes which the children had laundered.

Scrubbing, sweeping and dusting the home are given careful attention. How to make a bed correctly and many other details of home keeping are discussed and demonstrated.

Personal Hygiene.—This year, feeling that repetition of the same work might not be wise, personal hygiene became the subject for discussion. After much trouble with state authorities because of beauty shop laws, the teacher was permitted to take a course herself and to present the subject as a course in personal hygiene. Materials, including a second-hand drying machine, shampoo and manicure supplies, were bought at wholesale prices.

First, manicuring and massage of hands, arms, and elbows were taught. Later, shampooing, hair-arrangement, finger-waving, and hair cutting received attention. The teacher interested one hairdressing establishment in giving each girl in the class who desired it a professional permanent wave free of charge. What this has done to awaken their interest in their personal appearance is beyond words to describe. Naturally this involves laundering of towels, etc., all of which is done by the children in a small tin tub placed on the floor. We are hoping that by the time school opens this fall promised laundry tubs and shampoo basins will be installed by the board of education.

The course in personal hygiene and home making aims to create an interest in personal appearance; to develop an appreciation of correct dress; to form correct habits in care of hair, skin, teeth, nails, and clothing; to learn the principles of color harmony in clothes, accessories, and jewelry; and to recognize the importance of posture in health and appearance.

The importance and methods of sterilization and sanitation are considered and care of instruments and cabinet sterilizer, as well as the use of disinfectants and antiseptics, is taught.

The care of the supplies, such as towels, glassware, combs and brushes, scissors, clippers, nets, and shampoo aprons, is included in the course.

Under the subject of the skin, cleanliness, make-up, diseases, and tissue creams are considered. The topic of finger nails includes manicure, polish, cleanliness, and stains.

The study of hair covers the following: composition, varieties, uses, brushing and care, scalp manipulations and procedure, shampoo, soaps, and waving. The study of the teeth includes home care, dentistry, and mouth washes and powders.

Clothing is discussed from the point of view of appropriateness, materials, and styles. The subject of shoes is included.

The course in home making includes: care of furniture, glass, and linens; and the study of baby care includes the subjects of senses at birth, and the care and feeding of the baby.

In all three grades, English in all of its phases, as well as geography, hygiene, music, and arithmetic, is correlated with the special work.

Conclusion

The coming term will, of necessity, have many changes and additions. The work cannot be static but must meet the needs of the children and must be adapted to the limitations as well as to the possibilities of the equipment. With the growing interest shown by members of the department of superintendence and by awakening the interest of members of the board of education we hope to secure equipment to keep pace with our ever-widening plans for giving to these children practical training for living in the world in which they must find their places.

It has been said that, as a group, teachers of sight-saving classes are wholeheartedly devoted to their work. It has also been said that anyone looking for an easy job had better choose some other field. May I add that without patience, perseverance, and unlimited courage, a teacher is unwise to try experiments which may necessitate battling with the authorities and enduring heartbreaking disappointments and delays. May I also add that for those who are really interested in and fitted for this work, no other field of teaching can offer greater satisfaction.

The Rôle of the Social Worker in a Prevention of Blindness Program*

Lewis H. Carris and Eleanor Brown Merrill

THE social worker interprets the doctor's findings to the patient; she interprets the patient's social and personal problems to the doctor, informing him of the relevant facts; she urges examination and treatment of other members of the family when needed; and is responsible for follow-up. The fulfillment of these responsibilities in the care of eye patients is an active contribution to the sight conservation program.

THIRTY years have passed since a nation-wide lay program for prevention of blindness had its beginning in the United States, through the formation of a small volunteer committee in New York. And from the first, we note emphasis upon the social significance of visual handicaps and upon the responsibility of society as a whole to take part in the control of eye disorders.

The leading position of ophthalmology in preventive measures is well recognized and cannot be questioned. Remedial and restorative care provided through the skilled services of this professional group gives sight to many who might otherwise be doomed to lives of darkness; scientific knowledge as to the cause of visual loss and the possibility of safeguarding the eyes against deterioration and damage must be the foundation on which any program for prevention is based. Therefore, the ophthalmologist's responsibility for promoting and guiding activities in this field is great. That he, in a large measure, is meeting this responsibility is evidenced by attendance at this meeting, by the great amount of time and thought which our colleagues on the International Board and

* Paper presented at the annual meeting of International Association for Prevention of Blindness, held in Cairo, Egypt, December, 1937.

on the governing bodies of many national organizations are giving to the subject, and by the part they are taking in educational measures, as well as in the application of that special technique to which they have been dedicated.

Through the years, however, has grown an increasing awareness of the problem of safeguarding eyesight—not as the responsibility alone of any one group of individuals, but as a widespread obligation. The tragedy of blindness, the crime of needlessly impaired vision, do not reflect solely upon the individual and create a personal problem between him and his physician; nor can the world in general continue to accept with equanimity or fatalistic unconcern the fact that thousands suffer untold misery for lack of proper preventive measures. Educators, public health officials, nurses, industrialists, sanitary and illuminating engineers, social workers and all in any way concerned with human welfare must take their rightful place in the attack upon this social enemy.

Dr. Park Lewis in his stimulating paper* has laid emphasis on the social significance of efforts to prevent blindness and has further stressed the necessity of joint action if successful results are to be obtained. Upon the present speakers has devolved the task, or rather the privilege, of discussing specifically the rôle of the social worker in a prevention of blindness program.

Developments over the past quarter of a century have shown marked increase in a readiness to consider the welfare of each individual from the standpoint not only of his own needs, but also in relation to the community as a whole. Likewise, noticeable advance has been made in the disposition to consider handicapped or unsuccessful persons as individuals rather than as members of any particular group—each with his own personal problems to be treated and solved through individualized consideration and service. In case work, emphasis is put upon the need of understanding the health, emotional and economic problems of one's client; of seeing him as a member of a family group in which heredity, environment and personality must be taken into account; of relating his particular difficulties to the community itself and seeking help through various channels in their solution.

* "The Social Aspect of the Prevention of Blindness," presented at annual meeting of International Association for Prevention of Blindness, Cairo, Egypt, December, 1937.

Reports from many countries bring before us the heavy toll of government and private expenditures for the treatment of eye disease. It is impossible to get any clear picture of the extent to which clinics and hospitals are ministering to persons suffering from preventable eye diseases. Certainly a visit to any ophthalmological dispensary in the United States will show many with seriously impaired vision who by proper health teaching and guidance might never have been thus handicapped. Certain it is, too, that a vast number of patients, returning sporadically for treatments which because of their irregularity cannot but be unsatisfactory, could with proper control and planning be given remedial care that would clear up the condition and prevent further complications. Many who shop around from clinic to clinic in hope of a magic cure need that personal service and guidance which will insure consecutive and concentrated care.

The rôle of a social worker in the clinic or hospital which handles eye patients is a full one. She must interpret the doctor's findings and give her client an understanding of the condition and its needs, in order that there may be willingness to follow the prescribed treatment. She must interpret the patient's social and personal problems to the doctor in order that he may judge of their significance and advise in the necessary adjustment. She must inform the doctor of relevant facts, gained from her acquaintance with the family and home, which may have a bearing on the cause and progress of the eye involvement. She must secure examination and treatment of other members of the family when the need for such is apparent or even suspected. She must see that patients report to the clinic for treatment or check-up as directed. She must help in the solution of such economic or social problems as may be interfering with successful treatment.

May we draw upon the experience of a worker in the social service department of a large hospital to show some of the considerations involved in successfully handling many an eye case?

A nineteen-year-old Negress was referred to social service for instruction as to medical recommendations, and also to secure regular clinic attendance. Her trouble was a tubercular keratitis; and the need for guidance was apparent, so that both the patient and her family would realize the importance of proper diet, hygiene

and precautionary measures in the home. It was only in following this case intimately that the hospital personnel became aware of the extent to which this individual's eye difficulty was involved in the whole social and public health picture. Acquaintance with the home situation revealed that the patient was married and that a baby, born in the past year, had died at birth. The cause of death, as recorded in the hospital, was tuberculosis and congenital lues, with birth injury and malnutrition as possible contributing factors. A next step was to ascertain the husband's physical condition; and when tests disclosed the presence of syphilis, his acceptance of the necessary treatment was secured. He attended the salvarsan clinic regularly, and later another child was born free from handicap.

One can visualize the fine, professional technique employed in bringing about so happy a solution of a difficult and far-reaching problem. Though a higher standard of living was set by the institution of more balanced and appetizing meals, this was accomplished through interpretation and the teaching of food values rather than through increasing the family income. Similarly, patient and repeated explanation of the need for fresh air, sanitary precautions and regular living habits brought about an improved environment and adoption of a more wholesome life on the part of both husband and wife. With this social treatment as a supplement to the medical services so freely rendered through clinic provisions, we see the tubercular keratitis of our eye patient and her husband's syphilitic condition both clearing with every likelihood of permanency; we see awakened understanding of right living conditions and of family and community responsibility; we see the result in a healthy young future citizen instead of a child who, if life had been granted him, would have been a liability upon community, state and government.

The contribution which can be made to the field of sight conservation through social service in eye hospitals and clinics is being recognized in the United States where, to mention but one other diagnostic group, special emphasis has been put upon the value of such service with glaucoma patients. In a study conducted over a number of years at Massachusetts Eye and Ear Infirmary, in Boston, a worker was assigned to follow all glaucoma patients through the social service department in order to prevent lapses in treatment and to secure their fullest possible co-operation. Over

a period of seven years the number of cases under care increased from 200 to over 1,000, of which 654 were of primary type. Of these last, who reported regularly to the clinic from year to year, only 51 had to be referred to the Division for the Blind—a telling fact in view of the disastrous effects which this disease, if unchecked, may have upon eyesight. A social worker's part in the accomplishment of such results is plain. Through her close association with the ophthalmologist in charge she has opportunity to learn his opinion in regard to each case and his prognosis as to its future. She must use the knowledge so obtained in interpreting the condition to the patient and in helping him adjust to the situation. In this she may need to build up the patient's morale, secure more appropriate occupation, instruct both patient and family group in general and eye hygiene, secure medical attention as indicated, and help to untangle social and economic problems.

Centuries ago a Jewish physician, philosopher and theologian (Maimonides, 1135–1204 A.D.) preached: "The purpose of medicine is to teach humanity the causes of ill health, the correct methods of dieting, the ways for making the body capable of useful labor, how to prolong life and how to avoid disease." Are not these concepts the foundation of our present public health practice and must not a prevention of blindness program follow a like philosophy as it may be related to the specialty of eye conservation? To the world at large we must teach the causes of blindness and of defective vision, the place of nutrition and hygiene in relation to eye health, methods of safeguarding the eye against injury and harm and of keeping it in a state of greatest possible usefulness.

With different emphases and greater or less elaboration of this central theme, medical, public health and welfare workers must unite in what from the standpoint of mutual participation may be considered a common program. It is indeed encouraging to note that each year brings more universal acceptance of the belief that through one channel or another steps must be taken to see that the heavy toll of suffering and economic loss from unnecessarily impaired vision must be brought to a minimum. Report has been made elsewhere at this meeting of the countries now engaged in organized efforts to this end, and results, though difficult to measure, will be seen in an awakened consciousness of the need and a

unanimity of action. That such action may be centered under any one of several auspices is noted in the variation in administrative set-up. In the United States, for instance, prevention of blindness programs have been established by state departments of welfare in connection with their activities for the blind, by state boards of education, by boards of control, and by private undertaking. Recent thought has been given to the demonstration of one or more programs in sight conservation under public health auspices, through organizing units in certain state departments of health which may act as integrating media for all allied medical and social services, while at the same time providing a central bureau for concentrated effort.

An all-inclusive project, as considered, calls for closest working relations between physicians, educators, nurses, welfare workers, industrialists, vocational advisers, volunteer organizations and commissions for the blind. Whether the particular point of focus be placed under health, medical or welfare auspices—of official or volunteer nature—may be immaterial, so long as the undertaking is recognized in its true character of a positive, constructive effort to keep well eyes well and prevent destruction of sight.

And what of the social worker's rôle in a far-reaching enterprise of this nature? By reason of her training and experience in the field of human relationships, is she not peculiarly fitted to interpret the functions and aims of her program to the community and develop that esprit de corps which will lead to a full understanding and sharing of responsibility? Is she not ready to serve as a specialist in the social implications of eye disease, acting in capacity of adviser, consultant or case worker, as may be required in the accomplishment of a community plan for sight conservation?

Social work has been defined as neighborliness—a hospitality to the ideas, problems and aspirations of others. With this definition in mind, we can think of the social worker in a prevention of blindness program as one prepared to render real and vital service in our progress toward the desired goal.

Prevention of Blindness in South Carolina*

Pierre G. Jenkins, M.D., F.A.C.S.

DISCUSSING the prevalence of blindness in his own state, Dr. Jenkins points out various activities in sight saving which should be incorporated in a state-wide sight conservation program.

OF all the faculties, that of sight is most precious—next to the mind itself. Therefore, as our opportunities for prolonging life increase, so in direct proportion we increase our responsibility further to protect and to conserve these faculties that make for greater usefulness and happiness to those individuals whose span of years has been increased. The mere prolongation of life to some people already afflicted with a condition which prevents their fullest enjoyment of life is but prolonging a misery; and so it is with that great affliction which we call blindness.

The sentence of blindness, to many, is worse than the definite knowledge of certain and approaching death. On the other hand, the mass psychology of our times has led to a seeming indifference or callousness to human distress. Sometimes it almost seems that the natural instinct of the civilized human being to recoil from seeing, hearing, or reading about painful and mutilating accidents and horrible destruction of human life, is no longer present. Nevertheless, the keeping alive of this instinct is all important to the preservation of the race.

It is not a cowardly attribute to recoil from the thought of war, because it sickens our souls against the suffering and misery which it causes, and thereby awakens in us an urge to fight for those things which might prevent it. And so it is in our contemplation of devising ways and means for fighting disease. We must ever keep

* Paper presented at the 30th Annual Meeting of the South Carolina State Nurses' Association, held in Columbia, South Carolina, October, 1937.

before the people the actual horrors that would be visited upon a community should a dreadful scourge afflict the land at any time.

"And sudden death"—to borrow a well-known title from a remarkable and telling story, depicting the horrors of highway accidents, could well be applied at times to public health methods of educating the public. To modify that title, "AND SO, BLINDNESS," would be an excellent slogan to use in order to arouse the public in this State, not only to the plight of those already blind, but to inaugurate and keep going an effective program in the matter of preventing blindness.

The prevention of blindness, aside from its peculiar application to any particular geographical territory, includes many of the most important phases of preventive medicine itself.

What is Blindness?

It is important that we establish a definite and uniform policy the country over as to just what we really mean when we say that an individual is blind. In the past, many states have set up rather widely different standards in this matter. We must remember that there are varying degrees of blindness. The average individual usually assumes that a blind person is one who does not see anything, or possibly one whose maximum vision barely enables him to see light. It is said that this description would cover about one-half to two-thirds of the persons usually considered blind.

The Committee on Statistics of the Blind groups the blind into five categories, as follows:

1. Totally blind or having light perception only
2. Having "motion perception" and beginning "form perception" (up to 5/200)
3. Having "traveling sight" (5/200 to 10/200)
4. Having ability to read large headlines (10/200 to 20/200)
5. Borderline cases (20/200 or more, but not sufficient for use in an activity for which eyesight is essential).

The standard for South Carolina, as set forth in a recent communication from Dr. C. L. Kibler, supervising oculist of the South Carolina Board of Public Welfare, reads as follows: "The South Carolina Public Welfare Act states that a blind person must 'have no vision or whose vision with correcting glasses is so defective as

to prevent the performance of ordinary activities for which eyesight is essential.' The Federal Social Security Board and the State Department of Public Welfare have ruled that this is economic blindness and that economic blindness exists 'where there is visual acuity in the good eye of 20/200 or less.' "

In this connection, to quote from a paper by Miss C. Edith Kerby, statistician of the National Society for the Prevention of Blindness, "This knowledge of the degree of handicap is of interest, not only to the statistician but also to the administrator or case worker who may wish to use it as a guide in solving training or placement problems. It goes without saying that the ophthalmologist is obviously the best person to make an adequate determination of degree of vision.

"Nurses and case workers in general can make a noteworthy contribution, first by educating the public to the importance of eye examination; second, by referring suspected cases for examination at the time of occurrence of blindness, or preferably before that time; and third, by gathering for the examining physician authentic facts about the histories of the cases."

Prevalence of Blindness

At this time our state, as well as most of the other states in this country, is sadly in need of certain facts regarding blindness, before any program of prevention of this affliction can even be intelligently started. We do not know exactly how many blind people there are in this state. The United States census for 1930 reported that there were 63,489 blind in the United States. They admit this is an underestimate—that a figure nearer 100,000 or even greater would probably be more correct. This census (United States, 1930) report gave South Carolina 1,028 blind. Of this number, 456 were white and 572 colored. Dr. C. E. Rice of the United States Public Health Service states that by increasing the census findings by 50 per cent one can come nearer the true figure.

The Bureau of Research and Statistics of the Social Security Board in Washington, through its chief, Miss Mary Ross, recently made the following statement in a personal communication: "So far as we are aware, there is not even available any reliable recent estimate of the total blind population."

The American Foundation for the Blind estimates from its own researches that the ratio of the blind in the United States is one to every thousand seeing persons, and, applying this ratio for the country as a whole, the Foundation in a recent communication states that the blind population in South Carolina would be about 2,500. Mrs. Hirst Gifford, field representative of the Foundation, in a recent personal communication, states that from the information which was obtained last year in Charleston and Greenville Counties respectively it would seem that the blind population of the State would exceed this number.

We, therefore, see that, even with inadequate statistics, there is definite evidence of the existence of much blindness in this state. It is not too much to venture the statement that a considerable proportion of blindness occurring in South Carolina can be prevented. This statement is based on the facts concerning the causes of blindness in general as applied to the problem in our state.

The same inadequacy of statistics exists concerning causes of blindness as of the number who are really blind. Medically, we know what various eye disorders cause blindness, but the problem has been the obtaining of figures showing the proportional distribution of these etiological factors.

Committee on Statistics of the Blind

A great step forward in clarifying our knowledge in this regard has been made within the past few years by the Committee on Statistics of the Blind, jointly sponsored by the American Foundation for the Blind and the National Society for the Prevention of Blindness. They have drawn up a record form for physicians' reports on eye examinations which is concise and remarkably complete, and which enables the examining ophthalmologist to record his findings on a blind or near-blind patient in a way which will furnish statisticians, welfare boards, and health officials with material for future studies directly applicable to the work of prevention.

The recently set up South Carolina Board of Public Welfare has sent out forms which are practically identical with that designed by the Committee on Statistics of the Blind. These forms are filled out by the examining ophthalmologist for those seeking blind assistance under the Social Security Act.

There are many blind or near-blind patients, who, of course, do not come under the designation "needy blind." Therefore, information concerning them could be obtained only through their private ophthalmologists. It would be an excellent procedure for all ophthalmologists to keep a record, similar to the form mentioned above, of all blind or near-blind patients, rich and poor, and when the next general census is taken, or information is sought by such agencies as the Committee on Statistics of the Blind, these records (not necessarily the names of the individuals) would be immediately available from this important and reliable source. With the co-operation of many ophthalmologists throughout the country, the Committee has already secured much valuable information on the causes of blindness.

Using some of the figures as to causes of blindness in the United States, we can safely assume that the same factors operate as well, and in proportion, to the blind population of South Carolina. Only a few of the factors can be discussed here, and these have been selected not only because of the greater percentage of occurrence, but because they are at least in one group of factors peculiarly prevalent in this state, and furthermore are preventable. The latter group, that of the infectious diseases, classed as etiological factors, includes syphilis and ophthalmia neonatorum (so-called "babies' sore eyes"). This group accounts for 15 or 25 per cent of the cases of blindness, and the two diseases mentioned are the most important diseases in this group.

Syphilis as a Cause of Blindness

It is said that the general estimate that 15 per cent of all blindness is caused by syphilis would seem conservative. The American Foundation for the Blind states that the main cause of blindness in South Carolina is probably syphilis, basing its estimate on surveys made last year in two large and widely separate counties of the state.

The eye lesions resulting from syphilis, which we so often see, are frequently those associated with the inherited form of this disease. This is especially evident in children and young adults, who are the victims of interstitial keratitis, a lesion of the cornea—probably one of the most common stigmata of congenital syphilis.

Untreated, this condition in its acute stages produces marked impairment of sight and its end result is often blindness of varying degree.

The great concern of the ophthalmologist in these cases is that the patient should receive prompt and adequate antisyphilitic treatment. "The treatment of congenital syphilis is directed toward arresting further advance of the disease, healing of the lesions already present, and finally complete eradication of the infection."

Every recurrent attack of inflammation in the eye renders the prognosis for sight in that eye much less bright. It has been definitely shown that recurrences in the same eye, and involvement in the thus far unaffected other eye, can be sharply reduced by carrying out prompt and prolonged antisyphilitic treatment.

There is no condition which produces blindness (except ophthalmia neonatorum) in which the public health nurse and social worker can be of greater service than in this disease. Many patients, in spite of warning by the doctor that even though their eye symptoms, in the first attack, may and usually do improve within three months or less, do not seem to realize that the cause of the eye disease, syphilis, must be treated for a much longer period of time—possibly a year, and often longer—if their sight in years to come is to be preserved.

These patients must be followed up by the public health nurse or the social worker, and be encouraged to continue treatment. Furthermore, when such patients present themselves, it is most important that an effort be made to bring their parents under observation, for at least blood Wassermann and Kahn tests. In so doing we go a step further in preventing blindness from congenital syphilis. Many of the patient's families will be found to be infected and should be given antiluetic treatment. In fact, a sound public health policy, and one which is actually practised in the syphilis clinic at the Wills Eye Hospital, Philadelphia, is to examine not only the parents of these patients but all other living offspring of these parents, for stigmata of congenital syphilis, and to give the appropriate serologic tests. Of course, anyone found with the disease is put under treatment.

It is impossible to carry out such a program without a staff of trained field workers, so to speak, such as public health nurses or

trained social workers, or both. Such a personnel should be added to all public eye clinics in this state.

Interstitial keratitis as a cause of impaired sight and blindness can be largely removed when a commonsense program of syphilis control and prevention has been inaugurated and practised.

Wassermann Test for Pregnant Women

Surely the prevention of congenital syphilis and the prevention of blindness go hand in hand. There is no surer method of preventing congenital syphilis and its frequent accompaniment of blindness than by treating intensively and adequately the syphilitic pregnant woman.

An authority has stated, in this connection, that "it has been clinically proven that in the vast majority of instances congenital syphilis can be prevented by the institution of adequate treatment before the fifth month of pregnancy, even though the expectant mother be asymptomatic." He further states that "every family physician and prenatal clinician should never neglect to take a careful history and physical examination, including a Wassermann test, on all pregnant women before the fifth month of gestation."

It should be the duty of public health nurses constantly and in no uncertain way to stress to women the important fact of seeking medical advice and examination in the early months of pregnancy; for, in this way, syphilis in the mother may be detected in the beginning of her pregnancy, and if adequately treated, viable births, negative for congenital syphilis, may be markedly increased, and, on the other hand, viable births, positive for congenital syphilis, may be greatly decreased.

This method of attack is vital in our war against syphilis and its train of such tragedies as blindness. It is of interest to note that this method of attack is about to be carried out in an intensive manner in the out-patient department of Roper Hospital in Charleston. Those in our midst who are qualified to direct this work, state that great inroads against the prevalence of syphilis can be made in this way, and it is to be hoped that a similar program will be carried out throughout the State.

Follow-up work on those with acquired syphilis, suffering with other eye lesions resulting therefrom, such as acute and chronic

iridocyclitis, choroiditis, and lesions of the optic nerve, is also essential in the preservation of sight.

It is to be hoped that the announcement made last year, of the great war to be waged in this country against this devastating disease, which causes probably more blindness than anything else in South Carolina, will not fall on deaf ears of the medical profession and public health workers in this state.

The public must be educated, and largely by nurses and social workers who are engaged in public health work, but let those of the healing branch of medicine and those of the preventive branch of medicine get together in this great struggle and start to work immediately.

From our available knowledge, is it too much to say that when syphilis is conquered in this state, so will the major portion of blindness be prevented?

Ophthalmia Neonatorum

The early part of the twentieth century presented the situation that approximately 25 per cent of the inmates of institutions for the blind, in several large and progressive states of this country, were in these institutions because their blindness resulted from ophthalmia neonatorum. This fact is significant, especially in the light of the discovery by Credé, in the year 1881, of a method which he conclusively demonstrated at that time would prevent blindness from this cause. Up to the year 1907 this high percentage of cases of blindness resulting from this disease not only held true for the older inmates in these institutions, but also represented the average percentage of new cases being admitted to these institutions.

The year 1907 really marks the beginning of the work of prevention of blindness in this country, and this movement was largely inspired by the concern which many of the leading ophthalmologists of this country felt regarding the large number of cases of blindness resulting from ophthalmia neonatorum.

This, under the leadership of medical men, was the beginning of the work of that great and worthy organization, now known as the National Society for the Prevention of Blindness, which is entirely maintained by voluntary subscriptions. There is no organization in this country which has contributed more to the preven-

tion of blindness than this Society. The widespread dissemination of knowledge regarding the prophylaxis of ophthalmia neonatorum, by this Society, in the past thirty years, has contributed greatly to the 75 per cent reduction of blindness from this cause. The work of public health nurses in their contacts with midwives, and the instructions given them in caring for the eyes of infants at birth, has also been contributory to this great reduction in the number of cases of blindness caused by ophthalmia neonatorum.

To some of you it may seem unnecessary to discuss this condition as a cause of blindness to-day. But we must always remember that what has been accomplished in this regard has been due to the constant vigilance of the medical and nursing professions and of the public health authorities. The usual case of ophthalmia neonatorum which is most commonly seen, and the type which usually results in blindness, even if expertly treated, is that due to gonococcus infection. The prevalence of gonorrhea is an ever-present menace to health among the people of this state of South Carolina, and as long as this prevails, the possibility of contaminating the eyes of the newborn is always great. Therefore, a re-emphasis of the dangers of this disease and its continued presence among our population is always timely.

The South Carolina State Board of Health, in its 56th Annual Report (beginning July 1, 1934, and ending June 30, 1935), states that there were 136 cases of ophthalmia neonatorum occurring in South Carolina during that period. The following year, in the 57th Report, and for the period between July 1, 1935, and June 30, 1936, there were 116 cases.

It is of interest to note that of the total of 136 cases of ophthalmia neonatorum in South Carolina, for the period July 1, 1934, to June 30, 1935, thirty-seven occurred in one county, and the same county reported an occurrence of 39 of the total of 116 cases in the state for the period from July 1, 1935, through June 30, 1936.

In fairness to this county it should be pointed out that at least the cases seem to have been reported; in another large county, no cases of this disease were reported for either of the years mentioned, but after a careful check up of the records in the Charity Hospital in that county, it was revealed that at least 10 to 20 cases of ophthalmia neonatorum were being treated each year.

No doubt this laxity in reporting this disease to the local health boards exists in many of the counties of South Carolina. Certainly the prevalence of this disease is much greater than our health statistics reveal. A conservative estimate of its average annual occurrence in this state would probably be from 150 to 200 cases. In spite of the treatment which probably has been received, many of these infants to-day are either partially or totally blind.

Investigation has shown that in some areas in South Carolina, practically all of the cases of ophthalmia neonatorum occurred when the mother had been attended by a midwife. Usually where the public health personnel of a county maintains constant and unrelenting supervision over the work of midwives, the disease is not so prevalent. This is truly a public health problem, and one which can largely be solved by means of instruction and education through the public health nurse in a tactful approach to the midwife. The ideal will have been attained when we can dispense with the services of the midwife, but it seems that she will ever be with us.

One of the greatest authorities on ophthalmology has said that "there is perhaps no other eye disease in which the rigorous carrying out of prophylactic treatment would afford more gratifying results than in conjunctivitis of the newborn (ophthalmia neonatorum), which disease, by means of this treatment, might be made to disappear almost entirely."

The problem can further be solved and a great deal of blindness prevented in this state by reporting each new case of ophthalmia neonatorum to the local board of health. In fact, we have a law which requires every nurse, midwife or other person, not a legally qualified practitioner of medicine, to report all cases of inflamed eyes of the newborn. Each physician should also report such cases to the local board of health, for if the mother has been delivered by a midwife, he can then take the necessary steps to see if the instructions regarding the care of the newborn's eyes have been carried out. The South Carolina State Board of Health requires that registered midwives instill silver nitrate in the eyes of babies delivered by them immediately after birth. South Carolina can and should improve its record of the past, as well as of the present, in regard to ophthalmia neonatorum.

Fireworks Accidents

Any prevention of blindness program connotes, at the same time, the conservation of vision. Here lies a tremendous field in which public health nursing, as a part of the great body of medicine itself, can exert a proper and telling influence upon public thought and action.

The loss of sight resulting from injuries due to firearms, and especially fireworks, during the holiday season, is an all too frequent occurrence in this state. Each year every ophthalmologist is called upon to attend cases resulting from such accidents, and often the eyes of these patients are so badly damaged that they are beyond the point where even modern surgery can preserve the sight. The present laws regulating the use of these instruments of needless destruction to sight, and often to life itself, should be revised and made more stringent, and, furthermore, the police power of health authorities should be extended and used to guarantee their strict enforcement.

Industrial Accidents

The program of prevention of blindness in this state should embrace the revision of existing laws, or the enactment of new and better laws regarding the protection of the eyes of persons who work in industries presenting eye hazards. The furnishing of protective goggles by the employer to the worker should be compulsory. The worker should by law be required to wear the goggles when engaged in work which might endanger his eyes. Fortunately, many of our industries do not offer the great eye hazards which prevail in other states. Encouragement and co-operation in the matter of creating popular sentiment for such legislation are required.

The School and Sight Conservation

Educational work along the lines of the "Safety First" idea, which has been carried on from time to time in our schools through the Parent-Teachers Associations, should be continued. A sense of the value of eyesight and the dangers encountered from the use of unsafe toys and playthings which are often the means of producing eye injuries should be instilled in the child.

In spite of large sums spent on construction in recent years, much remains to be done in this state in the way of removing struc-

tural defects detrimental to proper illumination in our schools. While such matters seem far removed from anything pertaining to the production of blindness, many children have had the efficiency of their sight reduced in this way, and eyestrain commonly results.

The school authorities of this state must be awakened to the necessity of the establishment of sight-saving classes. As far as we know there is not such a class established in this state. According to the National Society for the Prevention of Blindness, "the most conservative estimate of the number of pupils requiring special educational facilities offered by sight-saving classes is 1 in 1,000 of the school population, but those who have had long experience in this work have found the proportion to be more nearly 1 in 500." In South Carolina, therefore, with a school population of 489,000, we should have at least 500 to 1,000 pupils who are eligible for such classes.

"The purpose of these classes," as stated by the National Society for the Prevention of Blindness, "is to make possible an education for children who are not blind, but who, because of serious eye difficulties, cannot advantageously carry on their school work under conditions provided for the normally seeing child. The ultimate object, as in all education, is to make possible for the child an opportunity to develop to the fullest his innate abilities."

Time does not allow further discussion of other phases of prevention of blindness in South Carolina, but probably enough has been said at least to help point the way by which much good can be accomplished; for, in the words of Helen Keller:

"The problem of prevention should be dealt with frankly. Physicians should take pains to disseminate knowledge needful for a clear understanding of the causes of blindness. The time for hinting at unpleasant truths is past. Let us insist that the state put into practice every known and approved method of prevention, and that physicians and teachers open wide the doors of knowledge for the people to enter. The facts are not agreeable reading: often they are revolting, but it is better that our sensibilities should be shocked rather than that we should be ignorant of facts on which rest sight, hearing, intelligence, morals, and the life of the children of men.

"Let us do our best to rend the thick curtain with which society is hiding its eyes from the unpleasant but needful truths."

Editorial

Louisa Lee Schuyler Centennial—1937

IN celebration of the centennial of the birth of Louisa Lee Schuyler, one of the founders of the National Society for the Prevention of Blindness, we are reprinting herewith from our *News Letter* of December, 1926:

Born in a period when the place and voice of woman were in the home, Louisa Lee Schuyler was destined to be an example of what a woman with sterling mind and staunch character can do in the world. From earliest girlhood she was a dominant figure in social work. In her early twenties she had already conceived the idea of the organization which grew to be the State Charities Aid Association. To be sure, its fruition was postponed for a period of ten years through the interruption of the Civil War and the many beneficent activities she engaged in during that time, but the fact that the conception did remain rooted through all those years and bloomed, is another indication of her profound sustaining qualities.

Not only could she wait ten years to carry out an ideal, but she could also respond at once to an inspiration and make it an enduring monument. Such indeed was her inspired conception of the Committee which, through her stimulation and endeavor, developed into the National Committee for the Prevention of Blindness.* The idea, coming to her at a time when most women would have felt that their share of worldly care and obligation was past, struck her receptive mind. That blindness in babies could be prevented, and was not, through ignorance, challenged her personally.

She has told, better than any one else could, how she conceived the idea of prevention of blindness work. She described how her attention had been directed to the need of such preventive work through a printed report on the condition of the blind in New York State made by a Commission appointed by the Legislature for the purpose. She told how horrified she was at the announcement that many, many children were blind unnecessarily, and that these children need never have been blind or never would have been blind had a simple precaution been taken at the time of their birth.

"I was horror-stricken. 'Unnecessarily blind,' I exclaimed. 'Why then are they blind? Something must be done about this!' "

*Changed to National Society for the Prevention of Blindness in 1928.

Thus she expressed herself regarding the first intimation she had that blindness could be prevented, and something was done about it. She immediately called a meeting of the writer of the report, Dr. Park Lewis, who still is one of our most active officers, together with a number of other socially minded acquaintances, many of whom are still active, and that gathering was the nucleus of the New York State Committee for the Prevention of Blindness which became the National Committee in 1915.

We need no review of Miss Schuyler's personal services. She gave of herself, as founder, as second vice-president, and as a member of the executive committee. She gave of her mind even after time had wrought its ravages on her tired body, and her spirit is a gift for all time.

The National Committee for the Prevention of Blindness cannot pay too high a tribute to the memory of one who never failed to see when something was to be done and did it. There is no marble fine enough to commemorate the rarity of her splendor. She has left behind her monuments of nobler quality. The State Charities Aid Association is one, the Bellevue Training School for Nurses is another, and, not least of them, is the National Committee for the Prevention of Blindness.

Note and Comment

Three States Open Sight-Saving Classes.—With the recent establishment of sight-saving classes in Memphis, Tenn.; Greensboro, N. C.; and Wichita, Kans., three new states have been added to the roster of those maintaining such classes. The Memphis class was promoted by the Junior League; the Greensboro Class, by the local Kiwanis Club; and the Wichita class, by the Kansas Society for the Prevention of Blindness.

Light Housekeeping.—Whether considered from the viewpoint of economy or of visibility, it is well worth the time and money spent to keep lighting fixtures clean and in good repair, according to Samuel G. Hibben, in a recent issue of the *National Safety News*, who sums the matter up with the slogan, "Water is cheaper than watts." The following are some causes of inefficient lighting: dirty lamps and accessories; darkened or discolored walls and ceilings; lamp bulbs of poor quality or low efficiency; empty sockets and unobserved burnouts; old lamps past their prime of usefulness; under-voltage burning of lamps; and improper combination of lamp and reflector. In a test case it was found that the remedying of these defects increased the foot-candles on desk-tops of a large office from 3.75 to 6.78—a gain of 81 per cent.

WPA Issues Bulletin on Goggles.—Four types of goggles used on WPA projects for protection of workers are covered by revised specifications in *WPA Safety Bulletin No. 8:* the cup type, the spectacle type, and welding, and the sun goggles. The specifications require that the materials used in the manufacture of these goggles shall be new and unused, suitable for the purpose, and of enduring quality. They shall also be non-irritating to the skin when subjected to perspiration, and all metals used shall be inherently corrosion-resistant.

The construction must be sufficiently sturdy to withstand rough handling and to stand up under the services for which the articles are intended. All parts shall be smooth and free of sharp edges or

any irregularities which may present a potential hazard through cutting or scratching the worker who is wearing the goggles.

A table of visibility and absorption of light to which the lenses of the goggles must comply is included in the specifications; drop tests to determine breaking quality are also specified.

Machinery Goes Pastel.—"Will you have a machine in shell pink or robin's egg blue?" the modern factory foreman may presumably ask his brawny workers. The question, however, is quite sound, as the modern trend in machinery colors is to effect high visibility by contrasting the color of the machine with the material which is fed into it. Painting machines and equipment in soft pastel shades reduces the worker's effort to see and thereby reduces eyestrain despite the necessity for the eyes to be focussed on operations for long periods at a time. In painting machines, a prime consideration is the use of paint for making levers, handles, knobs, etc., more visible against the background color employed. In daylight the visibility of one color on the background of another is indicated in the following chart:

Visibility	Decoration	Background
1	Black	Yellow
2	Green	White
3	Red	White
4	Blue	White
5	White	Blue
6	Black	White
7	Yellow	Black
8	White	Red
9	White	Green
10	White	Black
11	Red	Yellow
12	Green	Red
13	Red	Green
14	Blue	Red

Malnutrition Causes Night Blindness Among London Slums Children.—Scientific tests carried out on children from East End slums and public schoolboys in East Anglia revealed that from 22 to 36 per cent of the elementary schoolchildren were "definitely

subnormal" as compared with 10 per cent of the public schoolboys who were rated "slightly below normal." The tests further revealed a serious vitamin A deficiency among the elementary schoolchildren which caused them to make a poor showing when they were tested for night blindness by the photometer.

Catching False Claimants.—Writing recently on the subject of malingering after eye injuries, Dr. H. S. Hedges called attention to various tricks resorted to by knaves who make false claims of damage caused by accidents. Among the many malingerers who come to court, those claiming damage to eyesight are by no means the least numerous. They may come with all manner of claims, varying from complete blindness to persistent conjunctivitis, monocular blindness, partial loss of visual acuity in one or both eyes, contraction of fields, asthenopia, persistently dilated pupils, lid injury, etc.

The very behavior of the malingerer is open to suspicion. The big, dark glasses, the bandage on an eye that does not need it, the extreme photophobia, should all put the examiner on guard.

A previous record of vision is invaluable and may often settle the matter without further argument; it is therefore highly advisable that every person should be given an eye examination upon entering the employ of any company.

The unmasking of an unsophisticated malingerer claiming blindness in one eye is usually easy. The use of the Jackson cross-cylinder test or of Snellen's red-green types usually produces results. Another simple test is having the "victim" write his signature with a red pencil on white paper while a red glass is placed over the good eye. For the more skilful malingerer the use of the Worth amblyoscope is recommended.

Many of the other types of eye injuries are very difficult to judge and require not only skill on the part of the examiner but also considerable experience in handling cases where malingering is suspected.

"Quint" has a Squint.—An examination of the famous Dionne quintuplets reveals that their eyesight is normal except that Marie has a slight squint which can be corrected.

Tattooing Cornea with Precious Metals.—A method of tattooing the cornea with gold and platinum to improve vision has been described by Dr. Ramon Castroviejo, of Columbia Presbyterian Medical Center, who says that this procedure is one of the few recent additions to surgery of the cornea which have proved valuable. When superficial opaque spots develop on the cornea, especially near the pupil, they greatly interfere with vision by dispersing the light that passes through the translucent area. Tattooing is used to close up the spaces between the opaque spots and allow light to pass through a concentrated area.

Tattooing also has been used to improve the appearance of the eye in certain conditions, such as albinism of the iris, in which the eyes would be white instead of blue or brown.

India ink and other substances have been tried in corneal tattooing, Dr. Castroviejo said in his summary of corneal surgery. Gold was first used in 1911, and platinum in 1928. The metals, in the form of chlorides, are used in a solution which, after preliminary preparation of the eye, is placed on the opaque spot for two or three minutes. Then adrenalin chloride is added and the gold changes chemically so that a dark brown, almost black, coloring is produced.

Former Scholarship Student Speaks on Sight Conservation.—Fumiko Fukuoka, a scholarship student of the National Society for the Prevention of Blindness, who is now a medical social worker at St. Luke's International Medical Center in Tokyo, presented a paper at the World Conference Committee of the Japanese Education Association, held in Tokyo August 2–7, 1937. In her talk Miss Fukuoka gave a history of the accomplishments of the American National Society for the Prevention of Blindness and commented on the great need of similar work in Japan, where there is but one sight-saving class at the present time.

Color and Light Reduce Eyestrain of Schoolchildren.—Substitution of gay, cheerful colors in the classroom for the usual dull, drab yellow-and-white combination was recommended in a report made public recently by the New York City Board of Education. The report, prepared by the Illuminating Engineering Society, was based on a year's experimentation with lighting systems in the New York

City public schools. The major part of the study is concerned with improving lighting standards. Classrooms were found to range from four to eight foot-candles in the typical schools, while the recommended amount is a minimum of fifteen foot-candles.

To provide "pleasing variety," the report suggests that the classrooms be changed from the traditional cream hue to a more artistic color scheme. Combination of colors, such as a blue-green upper wall and a slightly darker shade for the lower, or a mixture of buff and gray, is held to be of value to the pupils.

Ophthalmologists Set Visual Standards for Drivers.—The paramount importance of good vision in driving and the frequency of accidents caused by the defective vision of drivers led to the preparation of a report by Doctors Nelson M. Black, Harry S. Gradle, and Albert C. Snell, which was read before the Section on Ophthalmology at the Eighty-eighth Annual Session of the American Medical Association at Atlantic City, N. J.

To determine visual standards which are adequate for a greater degree of safety in operating motor vehicles, the committee consulted the following for suggestions and advice: Council of State Governments, National Safety Council, American Automobile Association, National Society for the Prevention of Blindness, Bureau of Legal Medicine of the American Medical Association, United States Department of Commerce, National Bureau of Standards, National Research Council, and many students of traffic problems.

The minimum visual standards recommended vary according to whether the license is limited or unlimited, but in either case the license is granted only to those whose visual acuity and field of vision are sufficiently satisfactory for efficient operation of a motor vehicle.

Book Clinic Diagnoses the Printed Page.—An outstanding feature of the *New York Times* Book Fair in November was the book clinic, which showed twenty samples of printed pages, illustrating make-up faults frequently found in books. Much attention was given to the aesthetic appearance of the page as determined by proportions and type faces. The more important defects, however, were those which tended to cause eyestrain, such as printed lines

which were either too short or too long, printing which was too gray or too black, and paper with a finish either too glossy or too dull.

Orange Life-Savers (Protection, not Confection).—Use of colored life preservers is urged for all ships for greater visibility in case of accident, as the current type of life-saver in white or drab gray is practically invisible in the water, particularly when the sea is rough. A number of tests at the Dayton, Ohio, flying field revealed that chrome orange-yellow can be seen at five times as great a distance as any other color. The Bureau of Marine Inspection and Navigation of the Department of Commerce has given its formal approval of this orange-colored life preserver and it is now on the market.

Unbalanced Diet Affects Night Driving.—In a study made of 600 active adults to determine visual acuity under night driving conditions, it was found that those who had vitamin A deficiency and poor dark adaptation experienced difficulty in driving at night. Treatment with vitamin A and a change in diet restored the dark adaptation of each of these persons to normal. Five of the affected persons had experienced accidents at night—two with injury to pedestrians and three by collision with a fixed object. In each instance the driver was dazzled by the lights of a passing automobile. Several of the other affected drivers had done little or no driving at night for years. Others drove, but disliked it. Since being treated, all drive with ease at night and are entirely relieved of their former difficulties.

Lighting Conditions for Weavers.—A study undertaken by the London Industrial Health Research Board for the purpose of investigating the effects of conditions of artificial lighting on the performance of worsted weavers revealed—(1) that for weaving fairly dark colored suitings, a system of localized general lighting providing fairly uniform illumination on the cloth of about 30 foot-candles, facilitates the work of the weaver; (2) that other light distributions providing somewhat higher illumination of the important parts of the loom and a system of cross-lighting from one side of the looms did not give equally good results since they increased the brightness contrast between adjacent threads.

Humorous Safety Posters.—Teaching the lesson of safety by the humorous method of using a dunce as a model, the Travelers Insurance Company issues a film and posters showing "Ozzie," a stupid workman, depending on "luck" to save him from disaster. Typical of "Ozzie's" behavior is the use of a dirty metal tool to dig a speck from a fellow-worker's eye. In dozens of factories any workman who is foolishly careless or creates an unsafe situation is now labeled by his fellow-workers as an "Ozzie."

Sharp Decline in Fireworks Injuries.—A statement issued by Michael J. Angel, Acting Deputy Commissioner of Labor in New Jersey, indicates that accidents due to fireworks were greatly reduced in 1937, as shown by the following chart:

Year	*Accidents Reported*
1933	642
1934	1073
1935	837
1936	927
1937	36

Who Shall Make Eye Examinations?—The following resolution was adopted by the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, February, 1937:

"Whereas, The eyes and the sight of the school child are of the most vital importance for satisfactory school work, and their preservation for future health and efficiency depends upon their wise conservation during childhood; and

"Whereas, The school has a grave responsibility for the conservation of eyesight among school children; and

"Whereas, School administrators in many parts of the United States are frequently besieged with demands for admission into their school systems of eye examinations and eyeglass prescriptions by practitioners other than qualified doctors of medicine; and

"Whereas, The eye, as an organ of vital necessity, requires careful conservation and deserves treatment only at the hands of trained and competent persons; and

"Whereas, Teachers and nurses properly may and often do make rough tests of visual acuity in the classroom, but diagnosis of

diseases of the eye and of disturbances of vision requires more extensive examination and often involves treatment other than the mere fitting of glasses; and

"Whereas, Even the fitting of glasses often requires the paralysis of accommodation through the use of drugs popularly known as 'drops'; now therefore be it

"Resolved, That it is the sense of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, in meeting assembled at New Orleans, February 23, 1937, that the safety of the eyes of school children, the adequate diagnosis of disease, and the correct fitting of glasses require examination of children's eyes (beyond rough visual tests performed by teachers or nurses) by a licensed doctor of medicine and, upon his recommendation, by a medical specialist in diseases of the eye, properly known as an oculist or ophthalmologist."

Reading Clinic of the Air.—In a "reading clinic" recently broadcast over the Columbia Broadcasting System by Dr. Ruth Strang, Director of the Reading Clinic at Teachers College, Columbia University, a 500-word story was read by volunteer readers, who were later tested on their comprehension and memory of the story. This test revealed for all subjects an average reading speed of 475 words per minute and a memory score of 88 per cent, an exceptionally good showing.

Cuban Institute for Safeguarding Vision.—A society with the purpose of compiling statistics on ocular defects and of publishing facts about the most frequent causes of such defects has been established in Havana, according to word received from Dr. Tomás R. Yanes of that society. The president of the first council of the society is Dr. Yanes, who edits the *Cuban Review of Oto-Neuro-Ophthalmology;* and the remaining members of the council are distinguished physicians, architects, engineers and other representatives of the various activities responsible for the conservation of vision.

National Society Notes.—The annual conference of the Society was held at the Hotel Pennsylvania, New York City, in connection with the 66th Annual Meeting of the American Public Health Association, October 5 to 8. "Saving Sight Through Public Ac-

tion" was the subject presented by Dr. William F. Snow, general director of the American Social Hygiene Association, who was the principal speaker at the Society's annual meeting. "Syphilis of the Eye as a Factor in Industry" was discussed by Dr. Park Lewis, a vice president of the Society, at another session on the opening day. Mrs. Eleanor Brown Merrill, associate director, spoke for the Society at its dinner for executive health officers, during which the subject, "Possibilities for Further Statewide Development of Sight Conservation Through Co-operation of Interested Agencies," was discussed by various representatives of the Interorganization Committee on Sight Conservation.

In addition to her work with this Committee, Mrs. Merrill is serving as secretary of the Committee on Development of Medical Social Service in Eye Hospitals and Clinics of the New York City Welfare Council. Following an interview in the Society's office with Mrs. William H. Wilmer, Mrs. Merrill was called to Washington, D. C., for consultation by the newly formed District of Columbia Society for Prevention of Blindness. In the advancement of the Washington Society the services of Mr. Theodore O. Yoder, membership secretary, and Mr. David Resnick, director of publicity, will be extended early in January and again in March.

Mr. Resnick is serving as chairman of the publicity committee for the National Health Council. In this capacity he recently syndicated a series of six articles on health subjects to newspapers throughout the country, in connection with the 1937 Community Mobilization for Human Needs. The series included an article on Prevention of Blindness in the United States by Lewis H. Carris, the Society's managing director.

During an October field trip in Minnesota, Mrs. Winifred Hathaway, associate director, gave talks to audiences totalling 7,375, including talks given at refresher courses for nurses in Hibbing, St. Cloud, and Mankato. She also spoke to many groups of teachers throughout the state, including the Northern Minnesota Educational Association, the Southern Minnesota Educational Association, and the faculty and students of Duluth State Teachers College, Winona State Teachers College and St. Theresa College. Following these talks, she had numerous conferences with sight-saving class teachers and visited many sight-saving classes in both ele-

mentary and high schools, making suggestions for seating, lighting, blackboard work, and general eye care.

The lectures formerly given by Mr. Edward Van Cleve at the Harvard course at Perkins Institution in Boston were given this year by Mrs. Hathaway, who spoke on the prevention of blindness and on sight-saving classes. Among the students attending the course were three foreign students, representing Egypt, Japan, and England.

Through the efforts of Miss Anette M. Phelan, Ph.D., associate in health education, the Eye Health Committee of the American Student Health Association was organized to make a study of the eye health problems of college students. In this, they will have the aid of an advisory committee from the American Academy of Ophthalmology. The Eye Health Committee of the American Student Health Association consists of R. W. Bradshaw, M.D., of Oberlin College, chairman; Lee H. Ferguson, M.D., Western Reserve University; L. M. Hickernell, M.D., Syracuse University; and Ruby L. Cunningham, M.D., University of California. Dr. Phelan is the Society's representative on the Committee. The advisory committee from the American Academy of Ophthalmology consists of W. L. Benedict, M.D., chairman; LeGrand H. Hardy, M.D., and Harry S. Gradle, M.D.

Talks at state nurses' meetings in Martinsburg, W. Va., and Columbia, S. C., were given in October by Mrs. Francia Baird Crocker, R.N., associate for nursing activities. She also spent several days in Washington to formulate definite plans for work with the District of Columbia Junior League.

Following Mrs. Crocker's resignation in December, her duties will be assumed by Eleanor W. Mumford, R.N., who was previously assistant director of the National Organization for Public Health Nursing. Her career includes service in public health work with the Visiting Nurse Service of the Henry Street Settlement in New York City, rural nursing for the American Red Cross in Long Island and in Minnesota, as well as supervising experience in the Visiting Nurse Associations of Philadelphia, Pa., and Orange, N. J. She has also served as a health consultant with the Kellogg Foundation in Michigan and as advisory nurse in the Southern Berkshire Health District.

Current Articles of Interest

The Management of Intra-Ocular Foreign Bodies, William H. Evans, M.D., *Industrial Medicine,* November, 1937, published monthly by Industrial Medicine, Chicago, Ill. Despite the great decrease in industrial eye injuries with the growing use of goggles, many accidents still occur in which foreign bodies penetrate the eye. The treatment in such cases presents a delicate problem, as an error may not only cause the loss of the patient's vision but may also lead to a costly lawsuit. The author of this article, who has had considerable experience, enhances the value of the report by illustrations drawn from literature in the field. His advice is as follows:

1. In the case of every patient with a history of an ocular injury a complete and careful history and a thorough examination of both eyes are indicated, and x-ray examination should be made in practically all cases.
2. Every patient with an intra-ocular foreign body should be hospitalized.
3. Routine use of foreign protein, sulfanilamide and salicylates is indicated, with the hope of preventing and combating infection.
4. Early and frequent use of atropine is indicated in the majority of these eyes.
5. Make haste slowly in determining the procedure to be used in each individual case.
6. Traumatize the eye as little as possible, remembering most of the graver complications are a direct result of trauma or infection.
7. Use of the cautery, thermophore, or electro-coagulation is indicated where there has been a wound or incision made in the sclera, with the hope of preventing separation of the retina.
8. Search for and eliminate all foci of infection as soon as the patient's condition will permit.
9. Explain to the patient, or some responsible member of his family, the gravity of the condition.
10. Do not hesitate to ask for consultation, as very little commendation will be received no matter how brilliant the result, but much criticism is likely to be directed your way, even though every possible effort has been made to save the patient's sight.
11. Keep the patient under observation for possible visual changes that may occur at any time following injury and removal of a foreign body.

A Visual-Acuity Survey: Report of 721 Cases, Clarence W. Rainey, M.D., *American Journal of Ophthalmology*, September, 1937, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. This is the first clinical report since 1925 of a visual-efficiency survey using the percentage method. A preliminary survey of about 15,000 men between 20 and 75 years of age was made. Of these approximately 2,100 (14 per cent) were found with vision less than 100 per cent in one or both eyes, for distance or near, even with the aid of their present glasses, or with some external disease of the eye requiring further study. Seven hundred and twenty-one were chosen at random for this study. The author makes the following conclusions:

1. Because the visual efficiency rapidly decreases with age, due to the loss of accommodation and the prevalence of subnormal and abnormal conditions of the eyes, the need for periodic visual-efficiency examinations at one to two year intervals is apparent.
2. Homatropine (4 per cent) with cocaine (2 per cent) can be used conveniently in determining the refractive state of the eyes at any age, without risk of inducing acute glaucoma.
3. The use of 0.5 per cent atropine solution, four drops a day for four days, is recommended to supplement the effect of homatropine in cases of high refractive error.
4. Cylinder skiascopy, including the rotatory trial, was especially useful for patients whose vision could not be brought to normal and who were often unable to help in the subjective tests at the trial case.
5. The manifest method of refraction is inadequate and inefficient as compared with the method using cycloplegia.
6. The visual efficiency of each of the three groups could be increased by refraction and spectacles. The efficiency of the whole group was raised approximately 25 per cent for distance and 45 per cent for near. The gain of the group already wearing spectacles was 14 per cent for distance and 17 per cent for near.
7. The tests for color blindness were an aid to diagnosis.
8. The ophthalmologist best serves the interests of the employee and employer.
9. The Standard Method of Appraisal of Loss of Vision should be used as the basis of all group examinations.
10. Examinations of the visual fields with the tangent curtain should be made in all cases in which the vision is not normal after refractive errors have been corrected.

Divergent Strabismus, Miss E. E. Cass, *British Journal of Ophthalmology*, October, 1937, published monthly by the British Journal of Ophthalmology, Ltd., London, England. Starting with the statement that whereas the literature on the subject of convergent concomitant strabismus is redundant, that on divergent concomitant strabismus is comparatively scarce, the author summarizes the historical development of previous studies on this subject. She finally presents an analysis of the cases which she herself has studied, illustrating her findings in chart form. Concluding with a survey of the types of cases which respond to treatment, she discusses ways of helping by means of glasses, operations, and orthoptic training.

Diet and the Eyes, Raymond Emory Meek, M.D., *National Parent-Teacher*, August, 1937, published monthly by the Child Welfare Company, Washington, D. C. Modern medical science recognizes the fact that foods cannot be classified merely as "digestible" or "indigestible" but must be chosen with consideration for their effects on all organs of the body, including the eye. In this connection the effects of allergic reactions to certain foods are of considerable importance.

Allergy affects the eyes in many ways and some outstanding results of an idiosyncrasy to different foods may be headaches of the migraine type; inflammation of the lids or eczema; vernal catarrh —an inflammation of the conjunctiva or lining of the eyelids; glaucoma simplex or hardening of the eyeballs; ulcers of the cornea; iritis or inflammation of the colored or pigmented layers of the eye; uveitis; optic neuritis or inflammation of the nerve of the eye; and hives. While we cannot say positively that all these diseases of the eye are a result of food allergy, it is the opinion of some investigators that these conditions may be caused in this way. If the body is sensitized to foreign matter, the eye takes part in the responding sensitization, and the inflammatory reaction in the eye can be explained as a local reaction, a part of the response of the body.

Vitamins, too, must be considered in a diet planned to keep well eyes well and to keep defective eye conditions from progressing. Chief among the vitamins needed for eye health is vitamin A, the lack of which may cause "night blindness" or xerophthalmia. There is no way of telling positively to what extent diet affects astigma-

tism, nearsightedness, inflammation of lids, weak sight, sensitivity to light, blinking of the eyes, or eyestrain. It is known, however, that children who are rapidly becoming nearsighted and who are given a properly balanced diet with plenty of vitamins, respond favorably, and the tendency to high myopia is checked.

Ocular Headache, D. Stenhouse Stewart, M.R.C.S., L.R.C.P., D.O.M.S., *British Medical Journal,* July 10, 1937, published weekly by the British Medical Association, London, England. In order to discover whether a headache is of ocular origin, it is necessary to consider the many possible causes of the headache by means of a complete physical examination. The part of the examination directly pertaining to the eye consists of observation of the optic disks, the use of the Snellen vision measurement test, and the use of the convergiometer to discover whether eyestrain is caused by muscular imbalance. The use of test type and ophthalmoscope, and a rapid investigation of the lateral eye muscle balance at reading distance, will not reveal or exclude every ocular cause of headache, but will represent a simple, rapid, and sound method of insuring that appropriate ophthalmic attention is quickly given to those more obviously needing it.

The Testing of Fitness for Night Flying: The Light Sense, C. E. Ferree, Ph.D., and G. Rand, Ph.D., *American Journal of Ophthalmology,* August, 1937, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. In determining fitness for night flying, important functions to be tested are (a) the ability to see at night and at low illumination and the effect of dark adaptation on this ability and (b) the amount and speed of dark adaptation. Of these latter functions, speed of adaptation seems to be more important than amount of adaptation. To be fit for night flying the candidate must have a normal or better-than-normal rating in power to see at low illumination at the beginning of the period of dark adaptation and throughout its entire course.

Tests are described for the light minimum under light and dark adaptation and for determining the amount and speed of adaptation. A special test of fitness for night flying is also recommended which is sufficiently quick and convenient for use in routine testing

and a procedure is discussed for proving the significance of the test and for determining the critical values to be used in accepting and rejecting candidates for night flying. A suitable instrument is recommended and its advantages for making the test are briefly discussed.

The Physical Condition of Reading Disability Cases, Thomas Harrison Eames, M.D., *Archives of Pediatrics*, August, 1937, published monthly by E. B. Treat and Company, New York. Among the physical conditions that contribute to poor achievement in reading probably the most important are defects of the eyes, including subnormal vision, vision difficulties, accommodation-convergence insufficiencies, refractive errors, muscular imbalances and the like.

Subnormal vision occurred in 56 per cent of the cases of children with reading difficulty as compared with a 34 per cent frequency among unselected school children.

Cases of uncorrected hypermetropia often present normal vision, secured through excessive, constant contraction of the ciliary musculature. These children tend to tire more rapidly and often lose interest in their school tasks soon after starting them, loss of interest being coincident with accommodative fatigue. It will be seen by inspection of the figures that the frequency of hypermetropia is markedly higher among poor readers.

The lower frequency of myopia among children who have trouble in learning to read is natural enough. Low degrees of myopia may be favorable to reading through coincidence of the far point of distinct vision with the position at which texts are held habitually, thus making accommodative adjustment unnecessary. The medical importance of myopia must not be forgotten, notwithstanding little or no interference with reading in some of the cases encountered.

The difference between the groups as regards the frequency of heterophoria (muscular imbalance) in reading vision, and its most common form among school children, exophoria, is striking. Exophoria is a tendency toward insufficient convergence and may be blamed for loss of place and a good many of the confusions that occur in poor reading.

Book Reviews

THE SCIENCE OF SEEING. Matthew Luckiesh and Frank K. Moss. New York: D. Van Nostrand Co., 1937. 548 p.

This latest text from the Lighting Research Laboratory of the General Electric Company is a beautifully printed volume in which the authors attempt to integrate the material of their various previous publications and present in addition investigations completed since their last ambitious contribution (*Seeing*, 1931). The book deals essentially with lighting for seeing, which, incidentally, would have been a more appropriate title.

With reiteration worthy of Cato, Luckiesh for over twenty years has been stressing the importance of light and more light. That this evangelism has not been in vain is evidenced by the increasingly better lighting of stores, offices, factories, and homes. And though other writers on the subject may tend to discount his more extreme tenets, their views have nevertheless been influenced by the research emanating from his laboratory.

Inadequate light admittedly causes eyestrain, fatigue, decreased visual efficiency, and in other ways increases the costs of seeing. But it seems poor judgment to try to attribute also to this cause the defective vision of intellectual workers, and even to some degree the increase in defective vision occurring with age. To the authors, "it is conceivable that the reflex effects of critical seeing and the prevalence of mortality cases from heart disease in occupations demanding critical seeing may be related"—but to a cardiologist, hardly.

Clear seeing demands good light. In 20 per cent of industrial accidents, improper lighting was a contributory cause. During his occupancy of the White House, Theodore Roosevelt lost the sight of one eye in an injury received while boxing. The authors suggest that this misfortune could possibly have been avoided if the lighting had then been better.

The major problems of lighting practice—quantity, distribution, and spectral quality—are interestingly discussed with the authority derived from personal research. Illumination above mere visual re-

quirements increases visual efficiency—"production foot-candles"; further increments add to the ease of seeing, thus reducing nervous tension and promoting human welfare—"humanitarian foot-candles." "It may be conservatively estimated that a 10 per cent increase in production could be achieved universally by increasing the present average illumination of less than 5 foot-candles in work places to 25 foot-candles."

The choice of type-size for sight-saving classes has been necessarily influenced by economic considerations. The cost of books in 24-point type is about three times that of books in 18 point. For the average sight-saving class pupil the difference in size of 18 point and 24-point types can be offset by providing twice the foot-candles on the former. Unfortunately exceptions occur—one pupil was unable to read 18-point type even though the illumination was increased from 10 to 150 foot-candles.

Colored glasses have a very restricted field of use. In the choice of tint, yellow-green, the region of maximum selectivity in human vision, is generally to be preferred. On the rifle-range, such glasses aid definition and reduce the veiling blue haze of distance. At night on the highway, however, colored glasses, by reducing visibility, become a hazard. Glasses are sold for protection from ultra-violet energy when there is no energy of this sort present in sufficient amounts to be harmful.

Colored papers in printing are associated with unestablished claims. "Certainly there is no more magic in colored papers than in colored glasses."

For the lay reader much practical information of this type is popularly presented; while the interest of the technically indoctrinated will be stimulated by the many novel instruments and experiments described.

—James E. Lebensohn, M.D.

La Prophylaxie de la Cécité en Roumanie. Nicolas Blatt, M.D. Bucharest: Reprinted from the Journal, *Le Moment*, 1937. 60 p.

This booklet comprises a neatly organized summary of the work being done in the prevention of blindness in Rumania, treating the subject under the main headings of general information about

Rumania, statistical data, legislation regarding the prevention of blindness, financial resources, and propaganda. Particularly important are: the section on statistics, which not only itemizes the various causes of blindness but gives detailed discussions of certain of the leading causes; section on legislation, which describes laws for treatment of the venereal diseases and for checking the spread of infectious diseases, as well as laws requiring protection in industry and those requiring compulsory eye examinations in the schools and in the army; and the section on propaganda, describing various ways in which the public is educated in the conservation of vision (through newspapers, magazines, lectures, and radio talks). The report contains a brief bibliography of books in French and Rumanian on the subject of prevention of blindness.

THE SCIENTIFIC BASIS OF ILLUMINATING ENGINEERING. Parry Moon. New York: McGraw-Hill Book Company, 1936. 608 p.

That aspect of lighting practice strictly defined as illuminating engineering is extensively treated by the author as an outgrowth of notes used in teaching the subject. For the most part the treatment is exhaustive in the realms of physics of light production and light control. The inclusion of some of this material and most of the mathematical treatment is perhaps justified chiefly from the viewpoint of education of students. From the viewpoint of lighting practice such emphasis upon the physical and mathematical aspects may be misleading to those who do not realize that this link in the entire chain from the powerplant to the realm of seeing and of human beings is only a means to an end. The important end—easy, quick, accurate, certain, safe and comfortable seeing—is reached by the final link which must deal with specifications of light and lighting. Naturally a treatise "based on physics" provides little foundation for specifications of foot-candle levels and of lighting. A scientific basis for such specifications must be developed largely through psychophysiological studies of seeing and of the influences of seeing conditions upon human beings and their efficiency, comfort and welfare. The author's treatment of these complex aspects is so fragmentary that one wonders why he transgressed the boundaries established in the title and preface of the book. In certain aspects of illuminating engineering the author is

very much at home and has made a valuable contribution for those interested in the physical and mathematical aspects of light, radiant energy, light-sources, photometry, light control, lighting fixtures and installations.

—Matthew Luckiesh, D.Sc.

Briefer Comment

The Ocular Fundus in Diagnosis and Treatment. Donald Atkinson, M.D., F.A.C.S., Philadelphia: Lea & Febiger Co., 158 p. ill.

This study of the ocular fundus in health and disease is noteworthy in that it is the only English work on the subject in which the illustrations are the work of the author. Hence the value of the illustrations, particularly the excellent color plates, is greatly enhanced. As the book is highly technical in treatment, its permanent value will be limited to ophthalmologists; nevertheless, a study of the volume and particularly of the illustrations may well be recommended to sight-saving class instructors and others who wish to broaden their knowledge of the structure of the eye.

Light, the Raw Material of Vision. Thomas Hall Shastid, M.D. Ann Arbor: George Wahr, publisher, 1936. 64 p. ill.

This brief treatment of light by an eye physician is considered from the viewpoint of physics, the greater part of the volume being devoted to a historical survey of physicists in this field, including a discussion of their viewpoints and illustrated by several diagrams. The discussion of the natural sources of light (stars, sun, moon, etc.) forms a fairly obvious, but nevertheless essential chapter. In conclusion, the author analyzes the eye as a receiving instrument of light-waves and shows how these light-waves are transformed into images. The book is chiefly valuable in that it presents a new angle in the study of vision and as such is helpful in rounding out one's knowledge of the processes involved in the act of seeing.

Fourth Biennial Report. Capetown: South African National Council for the Blind, 1935–1936. 76 p.

While this report deals for the most part with the care of the blind, it also includes some very valuable notes on causes of blind-

ness and gives a survey of special education for blind and partially sighted children.

Twenty-Third Annual Report of the Ophthalmic Hospitals Section for 1935. Cairo: Government Press, 1937. 54 p.

This is a survey of the work done by the Ophthalmic Hospitals Section of Egypt, including statistical charts of causes of blindness, types of operations, and degrees of blindness, as well as detailed data about expenditures.

Books Received

Planning for Home Co-operation in Children's Work. Jean P. Gessell. New York: Methodist Book Concern, 1937. 48 p.

Annual Report. New York: The New York Institute for the Blind, 1937. 66 p.

Anuario Medico-Social de Cuba. Habana: Ucar, Garcia y Cia., 1937. 684 p. ill.

Teacher Preparation in Visual Education. Fannie W. Dunn and Etta Schneider. Washington: American Council on Education, 1936. 102 p.

Factors Related to the Changes in School Adjustment of High School Pupils. Lester A. Kirkendall, Ph.D. New York: Columbia University Bureau of Publications, 1937. 90 p.

Occupational Guidance. Paul W. Chapman. Atlanta: Turner E. Smith and Co., 1937. 640 p. ill.

Current Publications on Sight Conservation

Note.—The National Society for the Prevention of Blindness presents the most recent additions to its stock of publications. Except for the more expensive ones, single copies are sent free upon request. Unless otherwise specified, they are reprinted from THE SIGHT-SAVING REVIEW. New publications will be announced quarterly.

252. **Legal Status of the National Society for Prevention of Blindness,** Mason H. Bigelow. 8 p. Not only a discussion of the legal status of the National Society for Prevention of Blindness but a succinct presentation of its various services.

253. **Conquerors of Blindness.** 75 cts. per 100. Three-color flyer indicating the official and voluntary individuals responsible for sight conservation.

254. **Saving Sight Through Cooperation.** 75 cts. per 100. Three-color flyer indicating the official and voluntary groups active in sight conservation.

255. **Syphilis of the Eye as a Factor in Industry,** Park Lewis, M.D. 8 p. 5 cts. The author recommends a paraphrase of the old war-cry of Cato, Syphilis delendum est (Syphilis must be destroyed), as a slogan for a campaign for reducing accidents in industry and for reducing the number of blind and visually handicapped from this disease.

256. **Glaucoma,** M. Carl Wilensky, M.D. 16 p. 15 cts. The importance of early recognition and proper treatment of every type of glaucoma is emphasized by Dr. Wilensky, who also provided the very excellent illustrations accompanying the article.

257. **Development of Sight-Saving Class Work in the Fairhill School, Philadelphia,** M. Reba Sprowles. 12 p. 10 cts. This article indicates how a home economics course and courses in salesmanship, social studies, and gardening, as well as a home-making and personal hygiene course, were incorporated in the work of the sight-saving classes at the Fairhill School, Philadelphia.

258. **The Rôle of the Social Worker in a Prevention of Blindness Program,** Lewis H. Carris and Eleanor Brown Merrill. 8 p. 5 cts. The social worker interprets the doctor's findings to the patient; she interprets the patient's social and personal problems to the doctor, informing him of the relevant facts; she urges examination and treatment of other members of the family when needed; and is responsible for follow-up. The fulfillment of these responsibilities in the care of eye patients is an active contribution to the sight conservation program.

259. **Prevention of Blindness in South Carolina,** Pierre G. Jenkins, M.D. 12 p. 10 cts. Discussing the prevalence of blindness in his own state, Dr. Jenkins points out various activities in sight saving which

should be incorporated in a state-wide sight conservation program.

D109. What Light for the Eyes? James E. Lebensohn, M.D. Reprinted from *Hygeia*, November, 1937. 4 p. $1.75 per 100. One of a series of articles on the question of lighting being published by *Hygeia*.

D110. First Annual Summary of Fourth of July Injuries. Reprinted from the *Journal* of the American Medical Association, November 27, 1937. $1.75 per 100. This is a review by the American Medical Association of Fourth of July injuries in the United States.

Contributors to This Issue

A founder and vice-president of the Society, **Dr. Park Lewis** is well known to the readers of THE SIGHT-SAVING REVIEW.

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As principal of the Fairhill School, Philadelphia, Pa., **Miss M. Reba Sprowles** has an opportunity to co-ordinate the sight-saving class work with that of the regular classes.

Mr. Lewis H. Carris is managing director and **Mrs. Eleanor Brown Merrill** is associate director of the National Society for the Prevention of Blindness.

Dr. Pierre L. Jenkins is a practising ophthalmologist in Charleston, S. C.

Book reviewers: **Dr. James E. Lebensohn,** a practising ophthalmologist, is a frequent contributor to *Hygeia;* **Dr. Matthew Luckiesh** is a co-author with Dr. Frank K. Moss of many books and articles on the subject of lighting.

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